NATUR CYMRU

The Nature of Wales

Rhif/Number 18 • Spring/Gwanwyn 2006

In this edition:

- Honey buzzards
- Deer management
- Marine life
- Roadside havens
- Churchyard conservation
- Writing about the Gower
- Y dyfodol i'r moroedd
- Mapping the seabed

PLUS Books, News, Comment...

NATUR CYMRU
A Review of Wildlife in Wales

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Natur Cymru is intended to promote the exchange of information about biodiversity and encourage debate. If you have information, ideas for articles or artwork which you think might be of interest to readers, please contact the Editor.

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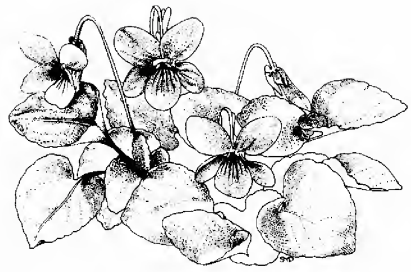
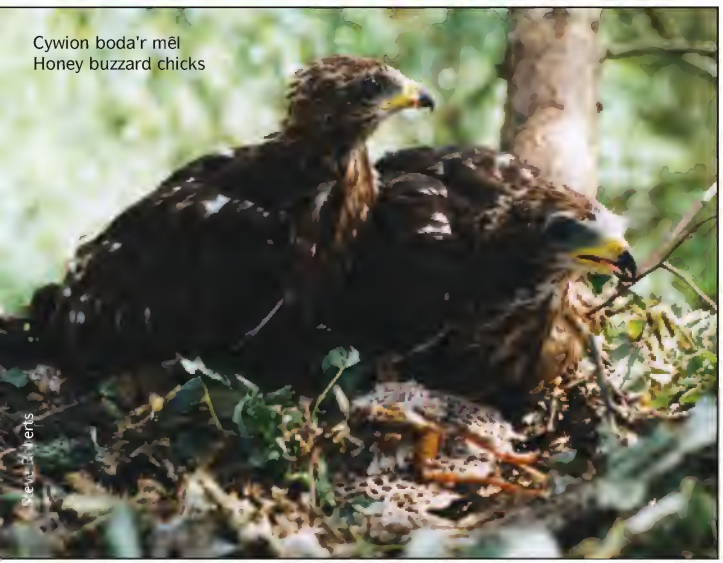
NATUR CYMRU GOLYGYDDOL



Deng mlynedd yn ôl, fe ddigwyddodd trychineb y *Sea Empress*. Tywalltwyd 72,000 o dunelli o olew crai i'r môr, gan fygwth y bywyd gwyllt cyfoethog a geid oddi ar arfordir Sir Benfro. Mae Morgan Parry yn cnoi cil dros y canlyniadau a'r gwersi a ddysgwyd, yn ogystal â'r gobeithion am gael Ddeddf Forol gref. Ar ôl y drychineb, llwyddodd y tonnau a'r gwynt cryf i wasgaru'r olew, ac mae'r amgylchedd wedi dod ato'i hun yn rhyfeddol o dda. Efallai na fyddwn mor lwcus y tro nesaf. Yn y cyfamser, rydym wedi dysgu llawer am ein moroedd dieithr, a dylai hyn gryfhau penderfyniad ein gwleidyddion i roi'r diogelwch cyfreithiol y mae'n ei haeddu i amgylchedd y môr.

Fel y gwelir, rydym wedi dysgu llawer iawn am gynefinoedd gwely'r môr yn ardal Môr Hafren. Mae arweinwyr prosiect yr arolwg unigryw hwn yn cydnabod pa mor bwysig yw esbonio'u gwaith a chanlyniadau'r arolwg. Wrth gwrs, mae i'r gwaith hwn werth addysgol, ac mae angen addysgu pob un ohonom am amgylchedd y môr. Mae erthyglau eraill yn sôn am waith gwirfoddolwyr sydd wedi datgelu cyfrinachau riffiau bas Bae Ceredigion, ac am y bywyd gwyllt y gallwch ei weld ar hyd ymyl y môr.



Cywion boda'r mêl
Honey buzzard chicks

Steve Roberts

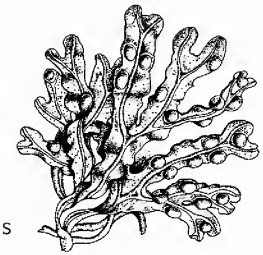
Ychydig iawn ohonom, mae'n debyg, sydd wedi gweld boda'r mêl; ond mae pethau'n newid, heb i'r adar dirgel hyn fod ar eu colled. Gobeithio'n wir y cânt dymor magu lwyddiannus eleni – a gobeithio y cawn ninnau weld eu hynt a'u helynt gyda chymorth camerâu clyfar.

Fel arfer, rydym yn ymdrin ag amrywiaeth eang o bynciau, er enghraifft cynlluniau ffyrdd, rheoli ceirw, cefndir rhyw lyfr arbennig ac ati. Yr hyn sydd gan y pynciau hyn yn gyffredin yw ymroddiad eu hawduron i fywyd gwyllt. Yn wir, mae'r ymdrech a wna pobl i arolygu, gwylio, rheoli neu ysgrifennu am fywyd gwyllt yn synnu dyn. Mae ymdrechion o'r fath yn haeddu cael eu cydnabod, ac ni ddylai'r rheini sy'n gweithio'n galed ar ran eu hamgylchedd lleol deimlo eu bod yn brwydro ar eu pen eu hunain. Mae'r stori sy'n sôn am fynwent leol yn ddigon i'n sobri ni i gyd, ac rwy'n mawr obeithio fod rhywun ag awdurdod yn gwrando yn rhywle.

Mae pen-blwyddi yn gyfle da i gnoi cil dros bethau, gan bwyso a mesur y cynnydd sydd wedi ei wneud. Daw'r rhifyn hwn â phum mlynedd cyntaf *Natur Cymru* i ben. Gobeithio eich bod yn hoffi'r newidiadau sydd wedi eu cyflwyno i'r cylchgrawn yn ystod y cyfnod cyntaf hwn yn ei hanes. Mae mwy o newidiadau ar y gweill, a hefyd mae ein statws yn newid, oherwydd o fis Ebrill ymlaen fe fyddwn ni'n Gwmni Cyfyngedig trwy Warant nad yw'n gwneud elw. Wedyn, fe fydd cynyddu nifer ein tanysgrifwyr hyd yn oed yn bwysicach nag y bu. Fe fydd dyfodol eich cylchgrawn yn dibynnu mwy nag erioed arnoch chi, y darllenydd. Gwyddom eich bod yn trysori byd natur Cymru; gobeithio y byddwch yn mwynhau'r cylchgrawn hwn i'r fath raddau nes annog eraill i'w ddarllen.

James Robertson

NATUR CYMRU EDITORIAL



It is just over ten years since the *Sea Empress* ran aground, spilling 72,000 tonnes of crude oil into the sea, threatening the rich marine life off the Pembrokeshire coast. Morgan Parry looks at the aftermath, lessons learnt and the hopes for a strong Marine Act. In the event, powerful wave and wind action did a remarkable job in dispersing the oil, and the environment has recovered remarkably well. We may not be so lucky next time. In the interim much has been learnt about our relatively uncharted marine waters, and this should strengthen the resolve of politicians to give the marine environment the strong legal protection it deserves.

As we report here, much has been learnt about the seabed habitats of the outer Bristol Channel. The project leaders of this unique survey recognise the importance of explaining their work and the survey results. This has great educational value, and we all need educating about the marine environment. Other articles report on the work of volunteers in uncovering the secrets of the shallow reefs in Cardigan Bay, and the marine life you can encounter along the sea's edge.

Mike Hughes/CCW

Oil washes ashore from the *Sea Empress*

Very few of us are likely to have seen a honey buzzard, but that is changing without cost to these mysterious birds; fingers crossed for a successful breeding season this year, which a good number of us will witness, thanks to some clever camera work.

As usual we cover a wide range of subjects, from a road scheme to deer management, to the story behind the writing of a book. What they have in common is the dedication of their authors to their wildlife subjects. It is remarkable how much energy people are prepared to devote to surveying, watching, managing or writing about wildlife. Such efforts deserve recognition, and those who valiantly work on behalf of their local environment should not feel they are fighting a dragon single-handed. Our story of a local churchyard is sobering, and I hope someone in a suitably high place is listening.

Anniversaries are a good opportunity to take stock, and review what progress has been made. This issue completes five years of publishing *Natur Cymru – The Nature of Wales*. We hope you like the changes that have been made to your magazine during this first phase of life. More are planned, and our status is changing, as we will be a non-profit making Limited Company from April onwards. Once an independent company, increasing the number of subscribers will become ever more important. The future of your magazine will depend more than ever on you, the reader. We know you care about the nature of Wales; we hope you enjoy the magazine enough to tell others about it.

James Robertson

Honey Buzzards

all eyes on the look-out

Female honey buzzard

All photos: Steve Roberts

Intimate, dramatic images of honey buzzards, never seen before, are among the fruits of a unique partnership project between RSPB Cymru, Neath Port Talbot County Borough Council, Forestry Commission Wales and the Wales Raptor Study Group. They have yielded research into a rare raptor and a very special public viewing opportunity.
***CATHIE HASLER** lets us in on the secret.*

A taste for the sweeter side

When I began working for the RSPB more than two years ago, I little imagined that my work in the area of people engagement would put me in such close quarters with one of the UK's rarest and most mysterious breeding raptors. Nor could I have imagined working alongside Wales' most eminent raptor experts.

Then in 2005, as part of an RSPB Cymru team working with three leading organisations in south Wales, I became involved in an ambitious project. Our target was an elusive one; it nests high in the forest canopy and is quieter and more discreet than

First chick at two days old: the second chick 'pipping' from the egg will take 24 hours to emerge.

its assumed closest relative, the common buzzard *Buteo buteo*. It remains something of an enigma to all except those avid enthusiasts patient and determined enough to watch for that distinctive continuous flight along their migration routes, to and from equatorial Africa.

This raptor is the majestic but distinctly mysterious honey buzzard *Pernis apivorous*, or *boda'r mêl* in Welsh. We were about to step into its forest territory to capture the most intimate moments of nest activity on film, while at the same time offering the general public an opportunity to see what we believed would be stunning images revealing fascinating behavioural ecology.

Why the fuss for a buzzard?

This is no ordinary buzzard and in fact the honey buzzard, while sharing similarities with the common buzzard, is more closely related biologically to the red kite *Milvus milvus*. It is also one of the world's most widespread raptors and in mainland Europe the population is defined as being stable, with breeding confirmed throughout the temperate and boreal regions and eastwards into Asia. While acknowledged as a summer visitor here, this handsome raptor rarely breeds in the UK, which lies on the most western fringe of its known range, making their appearance here in south Wales something of a cause to celebrate.

Figures for an actual breeding population vary quite significantly and indicate how much there is still to discover about this intriguing bird. The Joint Nature Conservation Committee (JNCC) has estimated that there are 10-30 breeding pairs in the UK (DETR/JNCC Raptor Working Group 2000), while published population figures in 2001 quote a figure of 27 confirmed breeding pairs. Another study determined that this figure could be nearer 50-60 pairs, but due to the difficulty of locating breeding birds some experts working in the field have estimated that there may be as many as 100 breeding honey buzzards in the UK.

Here in Wales the picture is also unclear. No statutory honey buzzard survey has ever been undertaken and the true extent of the Welsh population is unknown. This is partly due to the inconspicuous nature of the bird itself, which makes observations in the field something of a challenge. However, there is also reluctance to publish information on known nest sites because of the very real and serious concerns of disturbance by overzealous birdwatchers and persecution by egg collectors.

Vital statistics:	
Eggs:	1-3
Incubation:	30-35 days
Fledging:	40-45 days
Length:	52-60cm
Wingspan:	135-150cm
Weight:	600-1,100g

Nest visit

It was against this somewhat inconclusive backdrop that our project evolved. With great curiosity and excitement I found myself, one murky afternoon in June, being led through a labyrinth of mixed woodland in a valley in south Wales, in search of the secret nest site of this very bird.

Steve Roberts of the Wales Raptor Study Group is a recognised UK honey buzzard expert and had confirmed the nest site and its two adult inhabitants in May. With the essential licence obtained from the Countryside Council for Wales (CCW) and the engineering skills of Arthur and Jeff from the Forestry Commission's Radio Branch team, our goal was to install a small camera directly above the nest site, with minimal disturbance. The resulting footage

The chicks at three weeks old

would be available for public viewing at Afan Forest Park Visitor Centre, where it would hopefully arouse the curiosity of a wider audience.

Installation

Steve, harnessed and equipped with an array of technical odds and ends, was soon climbing the tall tree towards the nest, although it was difficult to make out much more than his safety rope through the dense foliage and branches! The installation didn't take long to complete. No branches were cut in order to place the camera in a suitable position; all that was required was a simple attachment to an existing branch. Its positioning also meant that the images would show the whole circumference of the nest.

Then, from our lookout point further along the forest, we saw her: the almost pigeon-like head with just the quickest hint of that pale eye, alert now; the head distinctively out of proportion from her brownish body, wings unfolding - silently - and then she was gone.

Greatly inspired, and for myself somewhat awed by the whole experience, we headed off out of the woodland.

Education, inspiration and unpredictability

The media were quick to ensure that the scheme secured its place in the local and regional arena following a successful gathering at Afan Forest Park Visitor Centre, where many local groups and organisations celebrated an official opening. We already had a significant amount of footage by this time, and such was the positioning of the camera that we could observe all of the nest activity as well as the peripherals. This showed many sequences of the female bringing back food, or sitting on sentry duty at the nest edge, and sometimes taking pieces of frogs or wasp larvae to feed herself.

Such schemes are never without their unpredictable moments, and soon two instances that could have been neither predicted nor prevented brought an early close to this fascinating window.

The first involved unseasonably high winds, which were so strong that they forced even the female off the nest. For the first chick, who was only a mere day or two old, it all proved too much and a gust sent the female and young bird over the nest edge.

Despite this sad turn of events, the footage continued to delight viewers with some wonderfully intimate moments of the female with her second chick, which was making reasonable progress. One of the most intriguing traits of the honey buzzard is the feeding preference that gives this raptor its alternative name of bee hawk, and some of the most interesting pieces of footage we have involve the female bringing back wasp nests with which to feed her young chick. This also provided a tool for the volunteers at the Visitor Centre to engage and educate the visitors who came to the scheme. The majority of them knew nothing or very little about the species and were eager to learn more. They were fascinated to be told that the honey buzzard is the only bird of prey to feed predominantly on the nests of bees and wasps and that it has bristly, well-packed feathers on its face to prevent it from getting stung.

Sadly, for the second chick, someone else was keeping a close eye on activities at this nest for a very different reason, and at just two weeks old the chick was taken by a goshawk. This sequence, lasting almost an hour, depicted the whole process quite graphically, from the first signs of the female looking agitated at the nest, to the lengthy intimidation by the goshawk (out of camera shot initially), eventually disconcerting the female enough to make her leave

The adult male offers a frog to the four week old chick

her nest and her one remaining chick unprotected. It is perhaps one of the most dramatic pieces of all the footage collected.

The RSPB was aware there had been other witnessed occasions of goshawk predation on honey buzzard chicks and Steve Roberts has confirmed one other instance of this in south Wales. This, however, was the first that had ever been documented on film. This incident was considered opportunistic but not likely to affect the population of honey buzzards in Wales. If this pair returned safely from Africa again in May next year, they would be unlikely to use this nest again; as with other raptors, honey buzzards have several nests which they use in rotation.

Still hopeful for 2006

The premature end to last year's filming means that we are ever more hopeful about the possibilities for another hidden camera this coming year. The safety of the birds will always take precedence, and the project could not take place at the expense of this, but we remain hopeful that perhaps this time we will be able to witness future generations of honey buzzards safely fly the nest. At the time of this publication the honey buzzards are yet to leave their African haunts, but they will soon be heading north-west. Here in south Wales we will be watching the skies.

Cathie Hasler *is RSPB Cymru's south and west Wales 'Showing People Birds' Officer, working as part of the* Aren't Welsh Birds Brilliant! *partnership.*

Cip ar fyd yr heliwr dirgel

Mae presenoldeb y boda mêl yng Nghymru yn dal i greu cynnwrf, gan ein bod ni ar ymyl mwyaf gorllewinol ardal ddosbarthiad yr aderyn ysglyfaethus hwn.

Sawl pâr sy'n nythu yma? Mae'r darlun yn aneglur. Ni chafwyd arolwg swyddogol hyd yma, ac mae'n aderyn hynod o anodd ei weld yn ein fforestydd trwchus. Mae pobl hefyd yn gyndyn o rannu gwybodaeth, rhag ofn denu sylw lladron wyau ac adarwyr gor-frwdfrydig.

Ond llynedd, diolch i fenter rhwng nifer o bartneriaid, llwyddodd llawer o bobl weld darluniau o foda mêl ar nyth yn Ne Cymru. Gwelwyd y fenyw yn dod 'nôl â nythod cacwn i'w bwydo i'r cywion a gwelwyd hefyd ddigwyddiadau hollol annisgwyl; chwythwyd un o'r cywion dros ochr y nyth gan wynt cryf a chipiwyd y llall gan walch Marth.

Ond nid yw'r troeon trwstan hyn yn debygol o effeithio'n ormodol ar y boblogaeth Gymreig o fodaod mêl. Bydd y tîm bellach yn disgwyl yn eiddgar i weld yr adar yn dychwelyd o'r Affrig, ac yn gosod offer unwaith eto er mwyn rhoi cyfle i'r cyhoedd ddysgu mwy am yr adar hyn sydd wedi ymgartrefu yn ein coedwigoedd.

Tom Knight

Malltraeth marsh from Parc-y-coed

What a difference a road makes

A silver lining to the environmental impacts of the A55

We are all aware of the environmental costs of road building: increased pollution, damaged landscapes and disappearing wildlife. But the results may not be so black and white. With sufficient mitigation which enjoys long-term attention, a road can provide opportunities for nature. ***RICHARD BIRCH*** *describes Anglesey's newest linear nature reserve.*

No environmentalist can seriously like a new road, and not many approved of the A55 construction between Britannia Bridge and Holyhead on Anglesey. It was easy, at the time, to count the cost of ecological damage as Malltraeth marsh was cut in half, newt ponds were filled in and rivers culverted. What was not appreciated was the amount of land which was acquired by compulsory purchase order as mitigation for the ecological impacts, how this land was to be managed for wildlife, and what the beneficial effects would be. Now, some five years of monitoring later, we can begin to assess how habitat creation and other mitigation have worked.

Habitat creation

Anglesey has a diverse range of habitats, so it is no surprise that habitat managed by those responsible for the A55 is equally diverse. There are a total of 232 hectares of habitat creation area within the road corridor, comprising 78 ha of marsh, 45 ha of open water, 17 ha of reedbed and 18 ha of sessile oak woodland. The number of protected species living within the habitats reflects this diversity.

Birds

Nesting birds recorded so far include reed bunting, skylark, stonechat, reed warbler, little grebe, gadwall, kestrel and buzzard. These are augmented in winter by significant numbers of water rail, little egret and snipe. The areas of open water, wide verges and planted shrubs, coupled with the freedom from human disturbance, are very good for many birds, but not all. Barn owls find the verges excellent hunting grounds, but never seem to develop the same road sense as kestrels or buzzards. A significant percentage of Anglesey's barn owl population ends up as a road kill statistic. Ongoing monitoring by CCW and A55 ecologists has lead to the implementation of strategies it is hoped may reduce these casualties.

Mammals, amphibians and reptiles

Resident mammals include a very high density of water voles – possibly the highest in Wales – and there are also otters and badgers. Two wetland areas created specifically for great crested newts also contain common frogs, common toads, palmate newts and common lizards.

Plants

Perhaps the real measure of the success of a habitat creation area is the unexpected species which it attracts. During the initial ecological assessment, three-lobed water crowfoot *Ranunculus tripartitus* was found on land within the road boundary. It is still there today: the land is grazed by cattle which poach the marshy areas to maintain the habitat of this Schedule 8 species (a Schedule 8 plant is one which is listed on Schedule 8 of the Wildlife and Countryside Act 1981 [as amended] and is fully protected under section 13 of the Act).

Since the road has been operating, many more plants have come to light. Bladder sedge *Carex vesicaria* was rediscovered on the edge of a habitat creation pond west of Gwalchmai after an absence of 43 years from the Anglesey flora. Further west, where the Afon Caradog runs under the road, a small population of water germander *Teucrium scorodonia* was found on the shingle margins of a drainage pond in 2004. This is another Schedule 8 plant, never before recorded on Anglesey, and its origins are currently under discussion. Is it native? Could it have existed undiscovered in a relict central Anglesey colony all this time? This particular pool is a favourite haunt of wintering waterfowl; so it is possible that birds coming from Ireland, where water germander is more frequent, may have brought seed over with them. The seed mix used to green up the road verges could be a possible explanation for a small colony of yellow bartsia *Parentucellia viscosa* on a roadside bank near Caergeiliog; another new record for Anglesey. Then there is the 'lawn' of pillwort *Pilularia globulifera* which was observed during the long dry summer of 2005 on the bed of another drainage pond near Caergeiliog. This plant is not only declining on Anglesey but across the whole of Europe, so a new colony is good news.

Finally, there are plants which are able to make use of disturbed conditions, including those which are the hitch-hikers of the plant

Richard Birch

Bladder sedge *Carex vesicaria*

Ffyrdd newydd – bendith neu felltith?

Pan adeiladwyd yr A55 newydd ar draws Sir Fôn roedd cryn ansicrwydd am ei effaith ar fywyd gwyllt. Dim ond nawr, bum mlynedd yn ddiweddarach, y gellir dechrau asesu pa mor effeithiol y bu'r ymdrechion i leihau a gwneud iawn am unrhyw ddifrod posib.

Crëwyd 232 hectar o gynefin amrywiol o fewn coridor y ffordd newydd. Bellach mae yma lu o wahanol greaduriaid, gan gynnwys poblogaeth gref o lygoden bengron y dŵr, nifer o amffibiaid ac amryw o adar sy'n nythu, gaeafu ac yn hela yma.

Adlewyrchiad o lwyddiant y gwaith yw presenoldeb planhigion anghyffredin neu brin fel crafanc-y-frân dridarn, yr hesgen chwysigennaidd, chwerwlys y dŵr, y pelenllys a'r gorudd melyn. Gwelir hefyd blanhigion sy'n hoffi'r cyflyrau 'arfordirol' hallt ar ymyl y ffordd, ynghyd â nifer o chwyn tir âr.

Wrth edrych ar yr erwau gwyrdd ac undonog o boptu'r ffordd efallai ei bod yn anodd dadlau, erbyn hyn, mai peth cwbl wael oedd datblygiad a arweiniodd at greu llain mor gyfoethog, gydag ymrwymiad i'w rheoli er lles bywyd gwyllt am flynyddoedd maith.

Richard Birch

Shaggy soldier

Richard Birch

Water germander Pillwort

world: plants like prickly lettuce *Lactuca serriola* and shaggy soldier *Galinsoja quadriradiata,* both Anglesey newcomers; those for which the hard shoulder is the equivalent to a salt-lashed beach, such as Danish scurvy-grass *Cochlearia danica* and grass-leaved orache *Atriplex littoralis*; and those which are the erstwhile arable weeds, nowadays confined to the road edge. These include corn marigold *Chrysanthemum segetum*, sun spurge *Euphorbia helioscopia* and field woundwort *Stachys arvensis*.

I would not suggest that the road was, environmentally speaking, a good thing (although you could find many residents of villages like Gaerwen who would say exactly that), but if you stood on the flyover where the A4080 crosses the A55 you would see that the overwhelming habitat type for miles around is improved grassland. Only within the road corridor are there reedy ponds, areas of unimproved grassland and scrub, and a commitment to manage these areas just so for the foreseeable future.

From that perspective, it is clear that the road represents a linear nature reserve that just happens to have traffic running through it. It will be interesting to see how the situation develops over time.

***Richard Birch** is the senior ecologist for Richards, Moorehead and Laing Ltd, the Landscape and Ecology consultants for UK Highways on the Anglesey A55.*

***Acknowledgements:** I would like to thank Ian Bonner, the county botanical recorder, who opened my eyes to the significance of the botanical finds; Jill Jackson, the Welsh Assembly Government's Ecologist; Len Wyatt of WAG for his procedural knowledge; and Paul Rayner, Road Manager for UK Highways.*

At the **sea's edge**

Above: Little cuttlefish

All photos: Michael Hammett

A world of seaweeds, sea anemones, sponges and blennies lies like a linear aquarium just below the high water mark along our sinuous coast. For all its innate appeal, luring us to dip our fingers into rock pools and our toes into sea water, we probably know the names of few of the creatures which we encounter there. ***MICHAEL HAMMETT*** *sheds some light on the startlingly beautiful plants and animals which inhabit this world.*

Each year as a child there are three events that we all look forward to with anticipation. There is the excitement of Christmas and the promise of our next birthday; the third event is going on holiday. Traditionally this has been a visit to the seaside, a chance to experience a change in environment with lots of fresh air. There is however a primitive and much deeper attraction hidden within each of us and this is the need to return to the source of our existence. Take a child to the sandy beach of a small bay surrounded by cliffs that have rock pools at low water and they are in a world of discovery and excitement. Some of us have never forgotten the experience of finding our first crab or prawn and a few have remained intoxicated by the changing variety of our inshore marine world.

Corkwing wrasse

The islands of Great Britain lie on the western edge of the

Tealia felinia Dahlia anenome

Starlet starfish

European continental plate and have several miles of shallow waters around the coastline. We are also fortunate to be bathed by warm sea currents on our Atlantic facing coasts without which, during the winter-time, our seas would freeze. Although our seas are not warm enough to support coral reefs we do have a vast area of shallow waters which support perhaps 7,000 species of marine animals. Many can be found just offshore, usually just below the low water mark. The best times to search are during spring tides when the tide is at its lowest possible level. Search sand and rock pools below the areas of the seaweed bladderwrack for the best results, and bear in mind that different animals occur as the year proceeds. To find some of our more secretive species it is best to go snorkelling or diving, as many hide in the sand or deep inside rock hollows when not covered by the tide. Never attempt to collect live animals for whatever reason unless you have an aquarium set up ready to receive them.

Marine invertebrates do not need to make physical contact during reproduction as the water in which they live acts as a carrier for their sperm and eggs, so most species synchronise the release of these cells into the open ocean. The resulting fertilised eggs then develop into an immature larval form. These larvae look very different to their adult form and they join that community of tiny organisms known as plankton, floating in the uppermost layers of the sea. The density of plankton, both plant and animal, may be so great in spring as to colour the sea.

Here is a small selection of the marine animals that may be found fairly close inshore. Sponges come in many shapes and forms: some grow fingers like corals and others form mushroom-like structures. Our commonest ones are brightly coloured and encrust the rocks in the lower rock pools. The cnidarians include the common and familiar sea anemones, as well as hydroids, corals and jellyfish. They are all armed with stinging cells containing nematocysts, each of which can fire a microscopic whip-like cord on contact with a foreign body. These hit the prey or predator with such force that they enter its body, injecting stinging and paralysing venom. Prey species are then quickly fed into a central mouth by tentacles

Rhosneigr reefs

Spiny squat lobster

Ophlitaspongia seriata

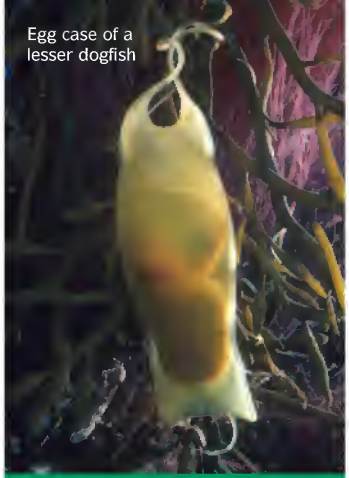
and the prey is engulfed by the hollow tubular body.

Among molluscs are sea slugs, sea snails such as whelks and periwinkles, bivalves such as mussels and cockles, and cephalopods such as cuttlefish and octopus. The armoured brigade of echinoderms include starfish, brittle stars, sea urchins, sea cucumbers and feather stars. There are a good number of starfish in our British waters but you will rarely encounter more than the common starfish and the cushion star in rock pools.

Although simple in appearance, sea squirts can be very colourful. They are far more complex than they appear and are thought to be our most primitive ancestor. At first they can be difficult to spot but a hunt around the holdfasts of the larger seaweeds at low water spring tides will usually turn up some examples.

The most commonly encountered fishes are the blennies and gobies. In addition to a surprising range of adult fishes such as clingfishes, butterfish and weavers, in late spring you may find juveniles of some

Anthopleura ballii



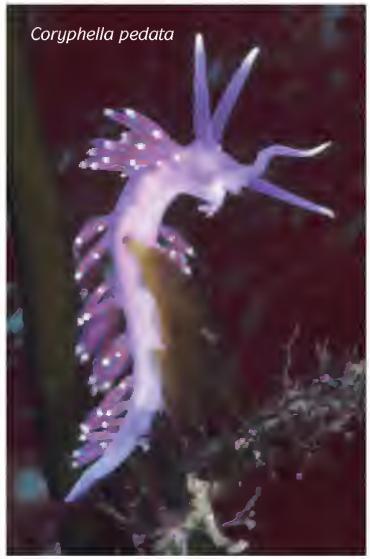
Egg case of a lesser dogfish

Ar lan y môr...

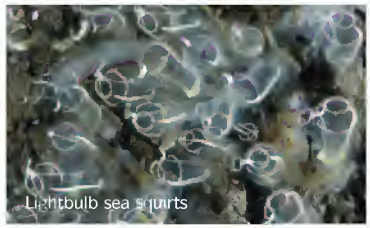
...ac yn y dyfroedd bas ar hyd arfordir Cymru ceir amrywiaeth ardderchog o gynefinoedd, ynghyd â miloedd o greaduriaid môr gwahanol. Mae sawl ffactor yn penderfynu pa fath o fywyd gwyllt sydd i'w weld mewn unrhyw fan – megis natur yr arwynebedd, cryfder y tonnau a'r cerrynt a hefyd dyfnder y dŵr.

Mae creaduriaid y môr wedi addasu'n rhyfeddol i'w cynefin. Er enghraifft, bydd rhai creaduriaid di-asgwrn-cefn yn gludo eu hwyau yn dynn at greigiau tra bydd eraill yn dibynnu ar y dŵr môr i gario wyau a had at ei gilydd - bydd y miliynau o larfae a grëir ar ôl ffrwythloni yn nofio gyda'r cymylau blancton sydd weithiau'n lliwio'r môr yn y gwanwyn ac yn creu ffynhonnell o fwyd i'r heulgi.

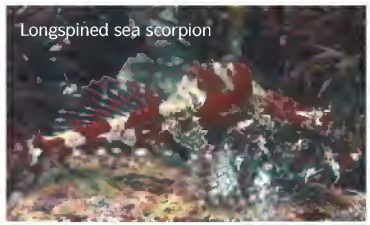
Mae'r erthygl yn cyflwyno rhai o'r grwpiau mwy adnabyddus o greaduriaid môr sydd i'w gweld yn weddol agos at y lan. Wrth chwilota ar hyd ein traethau gallwch weld amrywiaeth dda o sbyngau, cnidariaid fel yr anemonïau, abwydod, molysgiaid, draengroenogion a chwistrellau môr - ein hynafiaid mwyaf cyntefig!



Coryphella pedata



Lightbulb sea squirts



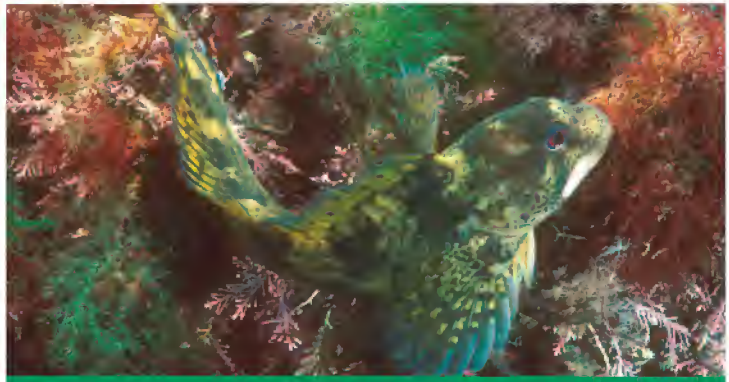
Longspined sea scorpion

of the deeper water fish like pollack and saithe, along with gurnards. You might even capture a young dogfish in its egg case or mermaid's purse.

When hunting for marine life please take care as the sea and shore can be treacherous, particularly during spring tides. Ensure you have an easy escape route planned and never cross onto an outer reef or sand bar without someone to warn you when it is time to retreat. Five minutes more may cost you your life.

Michael Hammett *is a biologist with a particular interest in marine and freshwater invertebrates and, as a wildlife photographer, contributes regularly to Natur Cymru.*

Hairy porcelain crab



Common blenny

Deddfu i sicrhau **dyfodol i'r moroedd**

Cafodd damwain olew y *Sea Empress* effaith drychinebus ar Sir Benfro
The *Sea Empress* oil spill devastated beaches in Pembrokeshire

Photo: WWF

Roedd trychineb y Sea Empress, nôl yn 1996, yn gryn ysgytwad. Bu'r gost amgylcheddol ac economaidd yn sylweddol. Er i nifer o'r argymhellion a wnaed ar ôl y digwyddiad hwn gael eu gweithredu erbyn hyn, mae MORGAN PARRY yn egluro bod llawer mwy o waith i'w wneud a pheryglon newydd yn ein hwynebu. Yn bennaf oll, mae angen creu fframwaith deddfwriaethol cryf, a hynny mewn ffordd gynhwysol, er mwyn rheoli ein moroedd mewn ffordd gynaliadwy

Ddeng mlynedd yn ôl, tarodd tancer olew yn erbyn y creigiau wrth ymyl St Anne's Head, ar arfordir Sir Benfro. Gollyngwyd 72,000 o dunelli o olew crai a 370 o dunelli o olew tanwydd trwm i'r môr. Cyn bo hir roedd gwaith glanhau ar raddfa anferth ar droed. Er bod yr effaith (fiolegol, economaidd a chymdeithasol) wedi mynd, erys llongddrylliad y *Sea Empress* yn ddyddiad cofiadwy trasig yn hanes amgylchedd Cymru.

Gollyngiad olew'r *Sea Empress* oedd un o'r deg mwyaf yn y byd. Cafodd effaith ar hyd at 200 cilometr o'r arfordir a chostiodd £28 miliwn i'w lanhau a £10 miliwn arall mewn iawndaliadau. Ond gallasai fod yn waeth o lawer, yn enwedig petai wedi digwydd ar adeg wahanol o'r flwyddyn gyda'r gwynt yn chwythu o gyfeiriad arall. Cyfanswm cymharol fychan o olew a gyrhaeddodd yr arfordir mewn gwirionedd - dim mwy na 7% (5,300 o dunelli). Roedd y rhywogaethau bywyd gwyllt yn llonydd neu wedi mudo, a thrwy ddefnyddio gwasgarwyr yn gynnar a pharhau i'w defnyddio, lleihawyd effaith y llygredd. Roedd yr olew hefyd yn ysgafn ac fe'i wasgarwyd yn rhwydd gan y gwynt, y tonnau ac anweddiad.

Er hynny, roedd yr effeithiau amgylcheddol yn sylweddol. Ar y draethlin, bu marwoldeb uchel ymhlith llygaid maharen a gastropodiaid llysysol a pharodd hwnnw am dymor. Dioddefodd sêr môr clustog hefyd, ond roeddent wedi ymadfer erbyn 1998. Ymadferodd y berdysyn (*Palaemon elegans*) a'r eurllys (*Halimone portulacoides*) yn araf yn y morfeydd heli.

Bu marwoldeb mawr ymhlith môr-hwyaid duon (*Melanitta nigra*) a dim ond yn araf iawn y mae'r adar hyn wedi ymadfer. Bu effaith eilaidd fawr ar rywogaethau mudol oherwydd i fannau bwydo pwysig gael eu colli. Glanhawyd 7,000 o adar a orchuddiwyd ag olew, ond ychydig ohonynt a lwyddodd i oroesi. Ymddengys na fu effaith o gwbl ar forloi a morfilod.

Y diwydiant bwyd môr a ddioddefodd yr effaith economaidd fwyaf. Bu gwaharddiad dros dro ar bysgod asgellog a chramenogion ac fe barodd hwn am tua 18 mis. Effeithiwyd ar wymon masnachol am gyfnod tebyg. Ni ddaeth unrhyw dystiolaeth i'r amlwg o ddifrod i rywogaethau a oedd yn silio, oherwydd yr adeg y digwyddodd y ddamwain, yn ôl pob tebyg. Bu'r effaith ar dwristiaeth yn llai na'r disgwyl, oherwydd y gwaith glanhau cyflym, ymdrechion y gweithredwyr lleol a ffyddlondeb yr ymwelwyr.

Lwc neu gynllunio doeth?

Ni fu gollyngiad olew mawr arall yn nyfroedd y DU ers i'r *Sea Empress* daro'r creigiau ar 15fed Chwefror, 1996. Mae hyn yn newyddion da, mae'n amlwg, ond a fuom yn lwcus neu a wnaethpwyd gwelliannau gwirioneddol? Mae nifer teithiau tanceri wedi codi'n sylweddol yn y 10 mlynedd diwethaf. Mae Asiantaeth y Môr a Gwylwyr y Glannau (MCA) yn delio gyda chymaint â 30 o ddigwyddiadau bob mis nad oes braidd dim sôn amdanynt yn y cyfryngau. Ond hefyd, yn y 10 mlynedd diwethaf, bu gwelliant o ran cadernid y llongau a'r seilwaith, o ran proffesiynoldeb morwyr, o ran y drefn a sefydlwyd ar gyfer y diwydiant llongau rhyngwladol gan y Sefydliad Morwrol Rhyngwladol ac o ran ymdrechion Llywodraeth y DU i wella'r ffordd rydym yn atal gollyngiadau, yn paratoi ar eu cyfer ac yn ymateb iddynt.

Yn dilyn llongddrylliad y *Sea Empress* bu adolygiad gan yr Arglwydd Donaldson o ba mor barod yw'r DU i ddelio â digwyddiadau mawr lle ceir llygredd gan olew. Cyhoeddwyd ei adolygiad ym 1999 a gwnaeth 26 o argymhellion, ac mae nifer o rhain wedi'u gweithredu. Bydd prosesau naturiol yn cael eu ddefnyddio yn y dyfodol yn sgil unrhyw ddigwyddiad; bydd tynfâd mawr wrth law yn rhai ardaloedd ond ddim Aberdaugleddau; bydd dau beilot ar fwrdd pob

Cychod y ceisio cadw'r olew dan reolaeth

Boats attempt to contain the oil

Michael Hughes/CCW

llong dros 120,000 o dunelli llwyth a bydd modelau cyfrifiadurol ar gael i ddisgrifio llifoedd. Os ddigwyddith gollyngiad olew eto, bydd ein hymateb yn well.

Fodd bynnag mae rhai o argymhellion Donaldson heb eu gweithredu eto. Ystyriwyd ei bod yn hanfodol dynodi Ardaloedd Morol sydd â Risg Uchel Amgylcheddol (MEHRAs) a disgwylir cyhoeddiad ar hyn cyn bo hir. Mae pryderon o hyd na fydd yr ardaloedd a ddewisir yn cynnwys yr ardaloedd 'â risg' a nodwyd yn benodol gan WWF, yr Ymddiriedolaethau Bywyd Gwyllt a'r RSPB. Mantais MEHRAs, yn ogystal â chodi ymwybyddiaeth a chyflwyno Mesurau Diogelu Cysylltiedig, yw targedu cyfarpar gwrthlygredd arbenigol ar yr ardaloedd sydd â mwy o angen. Hefyd, nid oes hyd yma unrhyw ofyniad statudol i awdurdodau lleol fod â chynllun wrth gefn. Nid yw'n glir pwy yw perchennog a phwy sy'n gyfrifol am lawer o ardaloedd rhynglanwol a gyda'r glannau. O ganlyniad mae'r cyfrifoldeb yn cael ei fwrw o'r naill berson neu gorff i'r llall.

Ydan ni wedi symud ymlaen?

Wrth nodi deng mlynedd ers llongddrylliad y *Sea Empress* daw cyfle i bwyso a mesur. Gwnaed ymdrechion sylweddol i atal trychineb arall. Fodd bynnag, mae bygythiadau newydd wedi dod i'r amlwg

wrth i'r hen rai ddiflannu. Mae nifer y teithiau ar y môr o gwmpas y DU yn cynyddu: mae llwythau sylweddol o olew trwm yn cael eu hallforio o Rwsia, ac oherwydd maint y tanceri mae trosglwyddo o long i long yn gyffredin ac yn creu peryglon newydd. Mae gweithgareddau newydd ar y môr yn cael eu hychwanegu at arferion sefydledig – e.e. datblygiadau ynni gwynt a llanw – gan greu peryglon ychwanegol i fordwyo. Yn olaf, mae newid yn yr hinsawdd yn arwain at fwy o stormydd, newid patrymau'r gwyntoedd a'r tonnau a chyflwr môr a thywydd anoddach ei ragweld: o ganlyniad mae angen ailasesu'r rhagdybiaethau ynghylch pa fannau sy'n gysgodol ac yn ddiogel.

Felly beth sydd angen ei wneud? Mae WWF wedi dadlau bod angen i lywodraethau gyflwyno cynllunio gofodol morol fel system i reoli gweithgareddau pobl ar y môr, gan fynd i'r afael â gwrthdaro rhwng gwahanol fuddiannau a galwadau am adnoddau morol sy'n cystadlu â'i gilydd; mae Môr Iwerddon yn fan delfrydol i gynllunio'n ofodol yn ogystal ag yn strategol. Rydym yn gofyn am agwedd gyfannol ar sail ecosystem, yn hytrach na chanolbwyntio ar sectorau unigol ar wahân, gan gydnabod bod yr amgylchedd morol yn ddynamig ac yn symudol ac nad oes iddo ffiniau gwleidyddol na gweinyddol clir.

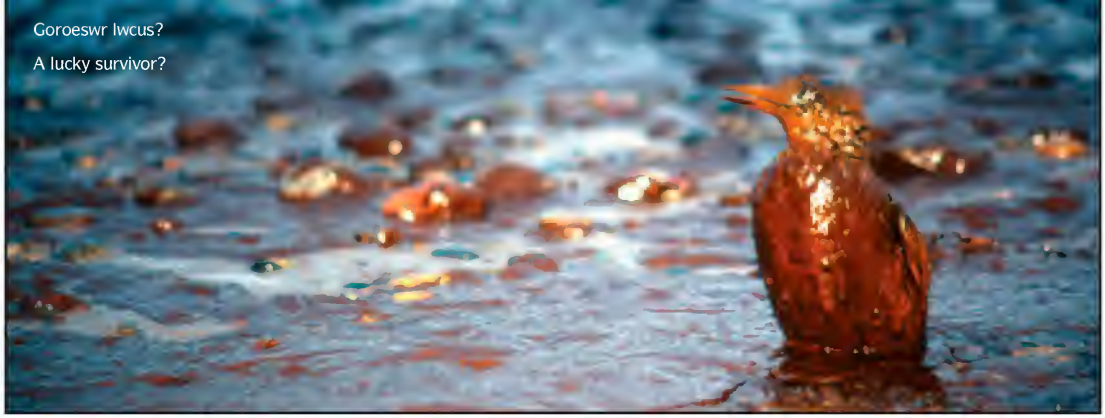
Ymgorfforodd Llywodraeth y DU lawer o'r syniadaeth hon i'w Hadroddiad Stiwardiaeth Forol (MSR) yn 2002. Mae rhai o'r materion polisi y mae'r adroddiad yn eu cwmpasu yn gyfrifoldeb i'r gweinyddiaethau datganoledig, a chymerodd Llywodraeth Cynulliad Cymru (LlCC) ran yn y broses o baratoi'r adroddiad. Ymhlith y llu o asiantaethau sydd â rhan yn yr amgylchedd morol, mae gan LCC gyfrifoldeb am reoleiddio ac amddiffyn hyd at 12 môr-filltir o'r lan, gyda rhai eithriadau pwysig megis datblygiadau olew a nwy a llongau, y mae'r DTI yn dal i fod yn gyfrifol amdanynt.

Yr angen am Fesur Morol

Yr hyn sydd ar goll yn awr yw'r fframwaith deddfwriaethol. Ar hyn o bryd, mae cannoedd o wahanol ddeddfau a pholisïau'n rheoli ein moroedd, yn ogystal â chytundebau, codau ymarfer, cynlluniau a chanllawiau dirifedi. Mae'r rhain yn achosi gwrthdaro a dryswch, ynghyd ag oedi, i ddatblygiad a chadwraeth natur. Yn ogystal â'r dryswch a'r gorgyffwrdd rhwng y gwahanol offerynnau cyfreithiol, mae ansicrwydd ynghylch pwerau a chyfrifoldebau LlCC; ni ellir datrys y sefyllfa hon ond trwy ddeddfwriaeth newydd. Cyhoeddodd Prif Weinidog y DU ei ymrwymiad i Fesur Morol gan y llywodraeth yn hydref 2004 pan ddywedodd "Rwy'n credu bod yna ddadleuon cryf dros ddull newydd o reoli ein moroedd, gan gynnwys Mesur Morol newydd."Yn ddiweddar drafftiodd WWF Fesur Morol i gyflymu'r broses, cyfraniad a groesawyd yn ddiweddar gan Asiantaeth yr Amgylchedd wrth lansio ei Strategaeth Forol. Mae WWF yn credu bod yn rhaid i'r Mesur Morol, yn ogystal â diffinio Diben Statudol a disgrifio gweledigaeth dymor-hir ar gyfer yr amgylchedd morol, sicrhau cadwraeth cynefinoedd a rhywogaethau morol sydd o bwys cenedlaethol. Dylid ymestyn system cynllunio "gofodol", tebyg i'r un sydd ar y tir, i ddyfroedd y DU. Yn ogystal â hyn, rhaid galluogi proses fwy effeithlon ac effeithiol o roi caniatâd, cynorthwyo ag adferiad stociau pysgod a chyflwyno system reoli integredig er mwyn atal gorecsbloetio dyfroedd y DU.

Yng Nghymru rhaid wrth gydweithredu effeithiol o fewn LlCC a gyda Llywodraeth y DU. Yn Lloegr mae Asiantaeth Forol newydd yn mynd i gael ei chreu er mwyn integreiddio rheoli'r môr ar draws sectorau amrywiol, ond ni fydd hyn yn digwydd yng Nghymru. Nid yw WWF wedi dadlau o blaid unrhyw drefniant sefydliadol penodol, gan y byddai'r drafodaeth wedyn yn canolbwyntio ar amddiffyn buddiannau breintiedig a strwythurau sy'n bodoli eisoes yn hytrach nag ar egwyddorion rheoli'r môr mewn modd call. Ond bydd yn rhaid i LCC ddatrys y trefniant sefydliadol cyn bo hir, neu bydd y dewisiadau a fydd ar gael iddi wedi cael eu cyfyngu ar lefel y DU. Mae angen i'r pleidiau gwleidyddol yng Nghymru ddeall y goblygiadau economaidd, cymdeithasol ac amgylcheddol enfawr sydd i'r materion hyn, a datblygu polisïau yn unol â hynny. Yn benodol, mae angen iddynt drafod a yw'r ddeddfwriaeth newydd yn rhoi cyfle i LCC gael mwy o bwerau i reoli Môr Tiriogaethol Cymru mewn modd cynaliadwy.

Ddeng mlynedd ar ôl llongddrylliad y *Sea Empress* mae gennym gyfle i wneud rhywbeth nad ydym erioed



WWF

Goroeswr lwcus?
A lucky survivor?

wedi llwyddo i'w wneud ar y tir: rheoli ein hadnoddau naturiol mewn modd cynaliadwy. Nid oes unrhyw berchenogaeth breifat na hawliau eiddo ynghlwm wrth yr adnodd hwn, a dim ond ychydig o gynseiliau hanesyddol a ffiniau gwleidyddol, ar raddfa fach, sy'n perthyn iddo Yn ddamcaniaethol, mae'n adnodd cyffredin o rywogaethau gwyllt ac ynni heb ei ddofi. Anfantais y ffaith bod yr adnodd ar gael i bawb yw nad oes neb yn cymryd cyfrifoldeb pan fo pethau'n mynd o chwith, neu pan fo'r adnodd wedi'i ddisbyddu. Rhaid i natur Cymru, o fewn yr hanner o'n gwlad sydd yn y môr ger y glannau, gael ei diogelu trwy Ddeddf Forol newydd gynhwysfawr, a rhaid i bawb sydd â buddiant yn y môr fod yn rhan o lunio'r Ddeddf honno.

***Morgan Parry** yw Pennaeth, WWF Cymru.*

***Nodyn gan y Golygydd:** Cyhoeddodd y Llywodraeth ar 13 Chwefror fod Ynysoedd Penfro wedi'u datgan fel Ardal Forol o Risg Amgylcheddol Uchel.*

Securing a future for our seas

Ten years ago an oil tanker went aground off St Anne's Head on the Pembrokeshire coast: 72,000 tonnes of crude oil were spilled into the sea resulting in significant biological and economic damage. Although the impact has faded, the *Sea Empress* disaster remains one of the tragically iconic dates in the history of the Welsh environment.

However, there hasn't been another major oil spill in UK waters since the *Sea Empress*. Have we been lucky or have real improvements been made? Lord Donaldson reviewed the UK's preparedness to deal with major oil pollution incidents in 1999, and made 26 recommendations. Many of these have been followed up, but some remain outstanding. There has been no designation of Marine Environmental High Risk Areas (MEHRAs) and there is not yet any statutory requirement for local authorities to have a contingency plan. And new threats have emerged as old ones have faded: maritime traffic has increased, ship-to-ship transfer is commonplace, and climate change is resulting in increased storminess.

WWF has argued that governments should introduce marine spatial planning as a system for managing human activities at sea, addressing conflicts of interests and competing demands for marine resources; the Irish Sea provides an ideal area to plan in this way. A holistic, ecosystem-based approach rather than a piecemeal focus on individual sectors is needed, recognising that the marine environment is dynamic and mobile and not subject to clear political or administrative boundaries. Many of the steps required are the responsibility of the Welsh Assembly Government.

What is now missing is the legislative framework. The forthcoming Marine Bill should define a long-term vision for the marine environment, protect nationally important marine habitats and species, and aid the recovery of fish stocks. Institutional arrangements will have to be resolved soon by WAG, who may need increased powers to manage the Wales Territorial Sea sustainably. Preparation for that Act must involve everyone in Wales who has an interest in the sea.

***Morgan Parry** is Director, WWF Cymru.*

***Editor's note:** The Government announced on February 13 that the Pembrokeshire Islands had been declared a Marine Environmental High Risk Area.*

Michael D Smith

Deer management and forestry

Red deer stag

Deer are spreading in Wales and as numbers increase, so does their impact on us and on other wildlife. The Forestry Commission (Wales) has a leading role in the study and management of these largely forest animals, as JOHN LEWIS describes.

When I started my employment with the Forestry Commission almost 25 years ago, working with the forest maintenance gang, I knew deer management was something I wanted to be involved in. During my early years as wildlife ranger there were reports of deer along the English border, but not in the Cambrian Mountain region where I was working at the time. However, when forest district boundaries changed it became clear that Offa's Dyke was no barrier to deer as they headed for the green, green grass of Wales – nothing was going to stop them! And so I became more involved with deer management.

FCW manages approximately 130,000 hectares of woodland for the Welsh Assembly Government (WAG). Visitors are most likely to see fallow deer and possibly red deer, as these two species are more tolerant of human activities. Roe and muntjac deer are smaller and much more secretive animals and there is only a small chance of seeing them. In some of the forests, there are places for the public to view deer in their natural surroundings.

F C Library

Roe deer

There are six species of deer in the UK:

ENGLISH	LATIN	WELSH
Fallow deer	*Dama dama*	Hydd brith
Roe deer	*Capreolus capreolus*	Iwrch
Muntjac deer	*Muntjacus reevesi*	Myntiac
Red deer	*Cervus elaphus*	Ewich goch
Chinese Water deer	*Hydropotes inermis inermi*	Carw'r dwr Tsieineaidd
Sika deer	*Cervus Nippon*	Carw Sica

The first four of these can be found on the Assembly Woodland Estate. There have been reports of Sika deer in some areas, possibly escapees from deer farms or wildlife parks but as yet these are not thought to have established themselves in Assembly Woodlands.

History and recognition

Fallow deer have a fascinating history in Britain and there is evidence that they were present before the last Ice Age, but became extinct. Because they were then reintroduced they are not recognised as native. The most common variety in Britain has a chestnut coat, with a white rump patch and relatively long tail. They are now present in many areas and have developed their own local characteristics, for example the long-haired fallow deer of Mortimer Forest in Shropshire. These were discovered and documented in 1953 by Gerald Springthorpe, a Forestry Commission Ranger, and titled *Dama dama springthorpeii*, and they do not occur anywhere else in the world!

Roe deer are one of only two species that can be considered indigenous to the UK: remains identified as roe deer have been found as far back as the Interglacial period (400,000 BC), along with other species now extinct in Britain. They have a rich red summer coat, similar to a fox, turning greyish in winter. Bucks are identified by their short antlers.

Muntjac deer are small and appear noticeably hunched forward when moving. When running they hold their heads low to the ground and raise their tails, as they do when they have been startled. Their coats can vary in colour and usually the summer coat is bright and shiny chestnut-red. The winter coat is dark brown to grey while the undersides remain white. Muntjac were introduced to England in the 19th century.

Red deer, the largest native mammal in Britain, have been here since this island was joined to mainland Europe so, like roe deer, they are classed as indigenous. In the summer their coats are dark red or brown, occasionally spotted, with a lighter cream underbelly. Winter coats change to a darker brown or grey.

Background

A survey in Wales carried out in 1996 by FCW suggested that deer populations were increasing and their territories were spreading across Wales. There are four main established fallow deer populations on the Assembly Woodland Estate, all close to parks from which they have escaped. Over the years numbers have increased. Fallow deer in the forests around Llandeilo are probably survivors from the old Gelli-aur Estate. They have shown little sign of increase in recent years and this could be due to management by local landowners. These woodlands will be surveyed and the deer numbers monitored over the coming years.

Red deer are becoming more apparent as they leave the established herd on

Michael D Smith

John Lewis

Keeping glades open is part of deer management

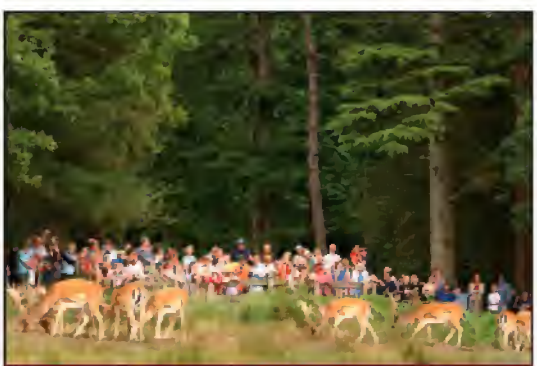
John Lewis

Mobile deer larder

the Brecon Beacons and disperse into woodland bordering the Brecon Beacons National Park. FCW is monitoring the situation closely.

Roe deer represent the greatest threat to the woodland environment because of the difficulty in managing them, especially if their numbers are allowed to increase and their territories spread. FCW has undertaken roe deer management along the Welsh borders since 1998: this is an important feature of managing forest and woodland biodiversity. If deer populations are allowed to increase to a high level they will have a seriously detrimental impact on ground flora and the establishment of tree crops, and the health of the herd will suffer if its numbers are not managed. Deer can also cause serious accidents on public highways and it has been estimated that between 30,000 and 50,000 collisions with deer cause several human fatalities and over 400 injuries each year (UK figures). As deer have no natural predators, woodland managers must keep deer populations healthy and managed at non-damaging levels.

F C Library



Fallow deer group

Sustainable deer management

Annual cull management figures are based on dung counting survey methodology. More recently, thermal imaging has been used for assessing deer numbers. Thermal imagers detect the radiant heat energy from warm-blooded animals and can make nocturnal and camouflaged animals highly conspicuous. Large animals can be detected at distances of up to 2 km, although heat energy cannot pass through solid objects.

As part of the Forest Design Planning process, staff identify key forest and woodland features to be managed for deer control. This leads to effective deer management and slows the spread of deer across FCW managed woodlands. It involves many aspects of forest design and planning. These include fencing, locating tree crops vulnerable to deer damage, designing deer glades and other open spaces, establishing riparian zones and suitable tracks, and managing old growth stands.

During my time carrying out deer management for FCW, I have found that the success of deer glades has depended on their location. Fallow and red deer can

F C Library

Muntjac

Ceirw ar garlam

Dros y 25 mlynedd ddiwethaf bu ceirw ar gynnydd ac ar grwydr o fewn coedwigoedd Cymru. O blith y chwe rhywogaeth o geirw sydd i'w cael yn y DU y mae pedair i'w gweld, erbyn hyn, o fewn fforestydd y Comisiwn Coedwigaeth.

Dwy o'r rhain sy'n frodorol i Brydain sef yr iwrch a'r carw coch. Mae'r olaf yn dod yn fwy amlwg wrth i greaduriaid adael y gyrr ar Fannau Brycheiniog ac ymledu i goedwigoedd cyfagos. Ond yr iwrch sy'n achosi cur pen i reolwyr coedwigoedd gan eu bod mor anodd eu rheoli. Ac mae gwir angen eu cadw dan reolaeth neu fe fyddai ein coedwigoedd, yn ogystal ag iechyd y gyrroedd, yn dioddef. Mae'r ceirw hefyd yn berygl i'r cyhoedd - mae tua 30,000- 50,000 o ddamweiniau'n digwydd bob blwyddyn rhwng ceir a cheirw.

Drwy gynnal arolwg o'r baw, neu ddefnyddio synwyryddion gwres, y cyfrir y ceirw ac mae hyn yn rhoi sail ar gyfer penderfynu pa nifer y dylid eu rheoli bob blwyddyn. Bydd y Comisiwn Coedwigaeth hefyd yn defnyddio gwybodaeth am y ceirw a'u symudiadau er mwyn cynllunio fforestydd mewn ffordd sy'n helpu rheoli'r creaduriaid hyn ac arafu eu lledaeniad drwy goedwigoedd Cymru.

be encouraged to visit man-made glades; roe and muntjac prefer to use areas where they feel safe, and which are not vulnerable to disturbance. This is when the deer have to be monitored and their movements observed before introducing any form of deer glade management.

Partnerships

The Wales Deer Initiative (WDI) was established in 1999 with the following aims:

- to assess and monitor wild deer species, and their populations and geographical spread in Wales
- to alert land managers to the need for a co-ordinated approach to the management of wild deer
- to assist and encourage landowners to form local Deer Management Groups.

FCW liase with WDI, gathering information on deer populations on the Assembly Woodland Estate. Together with WDI data collected from private landowners, this contributes to an overall picture of distribution and species throughout Wales.

FCW also monitors deer culls and movements of deer carcasses. In 2000 we designed a transportable deer larder for dealing with the deer that were being culled in one of our districts. We did not want the expense of transporting carcasses to a deer larder in Ludlow and, as all the deer were the result of management carried out in Wales, we thought it was appropriate to market the venison in Wales. We found a game dealer who was interested in marketing venison to the public and restaurants from his butcher's premises in the market town of Llanidloes. The type of transportable deer larder which has made this possible is probably the first to be used in Wales and means the public can now buy local Welsh venison from a local supplier.

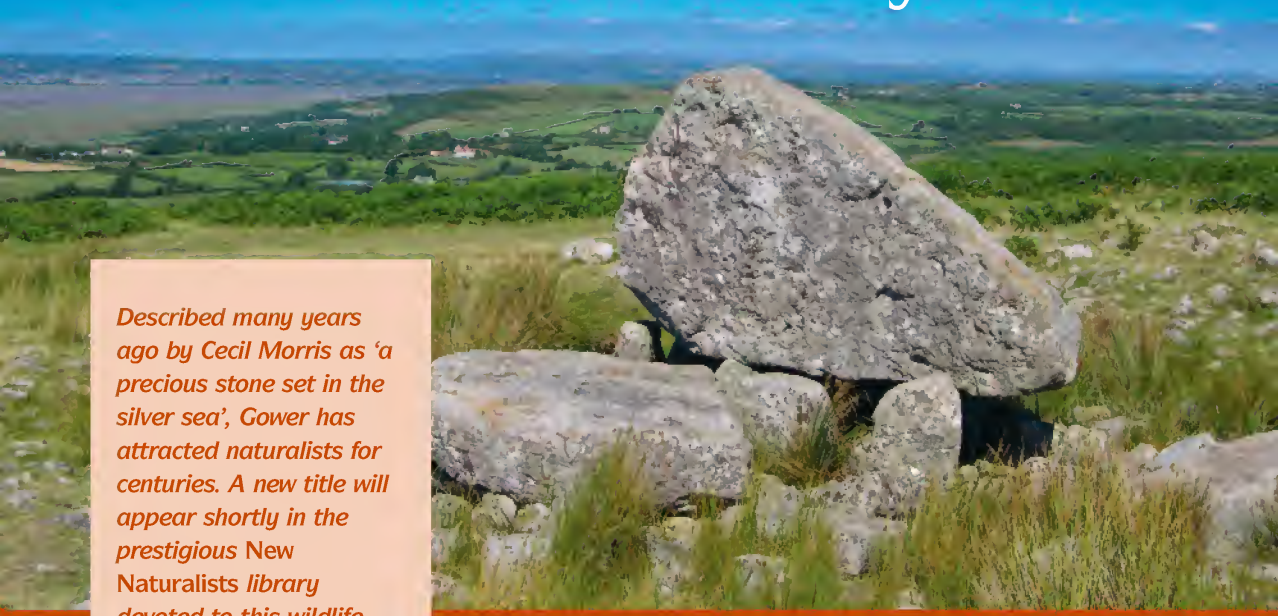
***John Lewis** is Wildlife Officer for Forestry Commission Wales. He advises on deer policy and co-ordinates the activities of six wildlife rangers, and was instrumental in developing a mobile deer larder to increase the marketability of venison obtained from the Assembly Woodland Estate.*

F C Library

The Wales Deer Initiative is funded by Forestry Commission Wales, Countryside Council for Wales, European Agriculture Guidance and Guarantee Fund, Farmers Union Wales, Forestry Timber Association and National Farmers Union of Wales.

Jonathan Mullard

Gower: the writing of a natural history



Above: Arthur's Stone, situated on Cefn Bryn Common overlooking the inlet and estuary

Described many years ago by Cecil Morris as 'a precious stone set in the silver sea', Gower has attracted naturalists for centuries. A new title will appear shortly in the prestigious New Naturalists *library devoted to this wildlife-rich and beautiful peninsula. Here its author,* ***JONATHAN MULLARD****, describes his first encounters with Gower, and how this led to a book which will appeal to naturalists far and wide.*

Jonathan Mullard

The author at the 40th anniversary celebrations for Whiteford Burrows National Nature Reserve, March 2005

My first experience of Gower was in the summer of 1982 when I was working with Max Nicholson, the pioneer conservationist, on urban nature projects in central London. Despite a number of interesting opportunities, the attractions of the capital had begun to fade in the heat and I felt the need to investigate new areas. Luckily my girlfriend had just acquired a car and I had a week's leave so we set out together to explore south Wales. We arrived in Gower late at night and camped near Oxwich, I cannot remember exactly where. What I will never forget, however, is waking up the next morning and finding Oxwich Bay spread out before me. Standing on Oxwich beach in the sunshine, I decided that I wanted to work in Gower, something that seemed an impossible aim at the time. I was amazingly lucky and only two years later achieved my goal. I subsequently spent nearly 14 years in the area, working firstly for what was then the Glamorgan Naturalist's Trust and then, after a short period away, as the Area of Outstanding Natural Beauty (AONB) and Heritage Coast Officer. During my time there I accumulated a large amount of information and local knowledge, but there was no time to consider the book I always felt Gower deserved.

What impressed me on that first visit, and what continues to mark the

David Painter

The robberfly *Pamponerus germanicus*, a common predator of the Gower dunes

peninsula out as a special place, is the incredible variety of habitats and species that occur within and around its relatively small boundary. As Cecil Morris wrote in his *Gossiping Guide to Gower*:

It has no rivers, but streams; no mountains but hills; no forests but woods; no cathedrals but churches. For the charm of Gower lies in this, that though a little country it possesses all the varied beauty of a big country. In what other tract of equal size will you find such heaths and cliffs, castles and golden beaches all together?

As well as these habitats there are also shingle beaches, ponds, pools, freshwater marshes and saltmarshes. In addition, the four tidal islands of Worms Head, Burry Holms, Mumbles Head and Inner Head add an extra dimension to the peninsula and its natural history.

The natural wonders of Gower

Due to this diversity Gower probably has more conservation designations than anywhere else in Britain. There are three National Nature Reserves, three Local Nature Reserves, five Special Areas of Conservation and over 25 Sites of Special Scientific Interest. In addition there are 19 Geological Conservation Review Sites, of national and international importance to earth science, on the coast alone. Gower is especially important to the understanding of geological processes because of the wide range of evidence that is available, including fossil-rich cave deposits that can be radiocarbon dated.

The peninsula is one of the main cave areas in Britain and the 'holes', as the Gower caves are traditionally called, have been well known for centuries. Probably the most famous site is Goat's Hole, Paviland; the location of the so-called 'Red Lady' that was excavated by the Reverend William Buckland in 1823. There are in fact an extremely large number of archaeological and historical sites of all periods and the peninsula has been described as 'an unrivalled microcosm of Wales's historic wealth' (Cadw 1998). The many nationally important sites include Bronze and Iron Age settlements, the medieval strip field system at Rhossili known as the Viel and the 16th century saltworks at Port Eynon. Unlike many other parts of Britain the influence of people over the millennia has generally had a positive effect, creating additional habitats and opportunities for wildlife.

Rhossili Bay

Despite the relatively small size of the peninsula, the scale of some of the habitats can be surprising to naturalists unfamiliar with the area. Whiteford Burrows, for instance, is one of the largest surviving calcareous dune systems in Britain, covering nearly 400 hectares. Similarly, nearly 7,000 hectares of common land have survived in Gower, probably a greater proportion than in any other similar area of lowland Britain. Elsewhere there has been a decline in grazing animals on commons, village greens and sand dunes, with a subsequent loss of wildlife interest, but in Gower the commons are still an important part of the farm economy. Oxwich Marsh, the most interesting and valuable freshwater habitat in the peninsula, covers about 40 hectares and is one of the largest reedswamps in Britain. Finally, the Burry Inlet and Loughor Estuary are the largest estuarine complex within Wales and form a real divide between Gower and Llanelli to the northwest.

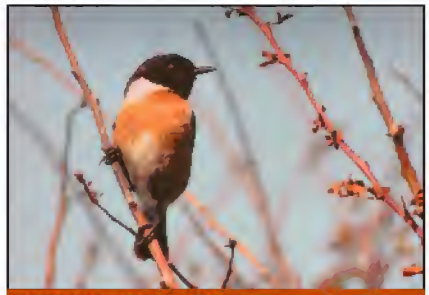
The estuary is the most important wholly Welsh estuary for waterfowl, valuable both as a wintering area and as a resting area during the spring and autumn passage for many arctic breeding species. It regularly holds more than 20,000 birds, with a peak 1993 total of over 30,000 birds. In the vegetation on the higher parts of the saltmarsh can be found the money spider *Baryphyma gowerense*, the only species to be named after the peninsula, while along the eastern fringe of Whiteford Burrows, in a line of seepage from the dunes onto the upper saltmarsh, can be found the very rare narrow-mouthed whorl snail *Vertigo angustior*. It is another of Gower's strengths that many of these habitats grade into one another, creating yet more opportunities for plants and animals.

The south coast, in particular, is noted for the mosaic of habitats that occur along its length, from intertidal rocks and exposed maritime grasslands in the west, to blackthorn and hazel scrub within the more sheltered valleys in the east. It is one of the classic botanical localities, supporting many rare species – and these are sometimes abundant. Uncommon limestone species plentiful in Gower include hoary rock-rose, bloody crane's-bill *Geranium sanguineum* and spring cinquefoil *Potentilla neumanniana*, while other important plants found on the cliffs include nit-grass *Gastridium ventricosum*, purple gromwell *Lithospermum purpureocaeruleum*, white horehound *Marrubium vulgare* and wild asparagus *Asparagus prostratus*.

David Painter

The speciality of Gower is, however, yellow whitlowgrass *Draba aizoides*, an attractive alpine flower, which occurs nowhere else in Britain and which is now the 'county flower' of Glamorgan.

Harold Grenfell



Stonechat, near Middleton, a common sight on the cliffs.

Insects

At the base of the mainly relict limestone cliffs are soft coastal cliffs that have been known as a key location for bees, wasps and ants for many years. Many British rarities occur in the peninsula, as well as many others that are extremely scarce in Wales. The speciality of the Horton area, for example, is a dark, solitary, mining bee *Andrena hattorfiana*, which requires the flowers of large scabious *Knautia arvensis*. Gower is also one of the twenty outstanding British localities for crickets and grasshoppers and related insects, with 16 species having been recorded, including grey bush cricket *Platycleis albopunctata*, Lesne's earwig *Forficula lesnei*, and tawny cockroach *Ectobius pallidus*. One of the most notable insects in the peninsula is, however, the silky wave moth *Idaea dilutaria*. This is the only macro-moth present that is listed in the Red Data Book and therefore recognised as critically endangered. The species has only been recorded from a few areas in Wales, notably the Great Orme, Caernarvonshire, Gower and Neath-Port Talbot. The Gower sand dunes are also well known for their rich insect life and there is a tradition of recording that extends back to the 19th century, when few other areas of Wales received any attention from entomologists. The real specialities here are the predatory insects, which include the robber fly *Pamponerus germanicus* and the stiletto fly *Dialinura anilis*. Predators are also abundant on the commons, and include the rare hornet robber fly *Asilus crabroniformis*.

Other habitats

The three large commons, Rhossili Down, Llanmadoc Hill and Cefn Bryn, all of which are actively grazed, are especially notable for the presence of western gorse *Ulex gallii* and bristle bent grass *Agrostis curtisii,* a plant community that here is at the northern limit of its range in Britain, being more usually characteristic of lowland heaths in Devon and Cornwall. Nearly three-quarters of the vegetation on the commons is lowland heathland and the peninsula is one of the most important areas in Britain, and indeed Europe, for this habitat.

Surrounding the commons are arable fields that have important populations of rare plants growing alongside the crop. These plants, once denigrated as agricultural weeds, are now known as *archaeophytes* and have an immense cultural significance. It is becoming increasingly clear that Gower is one of the strongholds of this ancient flora in Britain and it is still possible to find fields containing increasingly scarce plants such as corn marigold *Chrysanthemum segetum*, sharp-leaved fluellen *Kickxia elatine* or wild radish *Raphanus raphanistrum*.

There is not space to describe them here, but other habitats covered in the book, together with their characteristic flora and fauna, include broadleaved woodland, hedges, orchards, shingle beaches (once again Gower has some of the most undisturbed examples in Britain), the seashore, the surrounding sea and the islands.

Writing the book

Throughout my career in conservation the *New Naturalist* series has been, and continues to be, a constant source of inspiration to me. Finding a copy of William Condry's volume on the natural history of Wales on a Cardiff bookshop shelf in 1984 was a special experience, though I would, of course, claim that he did not give enough attention to Gower! Following in his footsteps has been a time consuming but interesting exercise, taking from start to finish about four years. A particularly enjoyable part of writing the book has been the contacts I have made, or re-established, with a large number of people. Given the richness of Gower and its natural history it would have been impossible to have completed the task

Harold Grenfell

Three Cliff Bay, voted 'one of the five best views in Britain' by the readers of Country Life magazine.

without their help. The contract with the publishers was originally for a book of 100,000 words, but in the end I wrote 150,000 words and after some discussion we compromised on 130,000. So 20,000 words had to be cut at the last moment. The main casualty was the final chapter entitled 'The Enquiring Spirit', which was meant to highlight the potential for readers interested in exploring the natural history of the peninsula for themselves. I intend to publish this elsewhere since, despite all the activity, there has never been an overall audit of the natural history of Gower.

The assessment that has been produced through writing the book will hopefully complement that created by the 'professional' approach of producing 'Habitat Action Plans' and 'Species Action Plans'. Driven by habitats and species of conservation concern, these documents can only, by their very nature, work with the known and the rare. There is a need, however, to value and understand the commonplace, and indeed research the unknown, and this is a key role for the 'amateur' naturalist. As a society we tend to place a higher value on rare plants and animals than common species and yet both desperately need our consideration, particularly in this period of rapid change. In writing the book I consciously, and perhaps controversially, avoided using the term 'biodiversity', since it has become an incredibly overused term, which is often scattered unthinkingly through reports and journals. Enormous efforts are put into writing 'Biodiversity Action Plans', but we fail to grasp the overriding message that plants and animals will look after themselves if they have the space to do so. Except for a few remaining areas like Gower, it is this space we seem unable to provide, despite the lessons from the Netherlands where the Dutch seem to do more with less.

Further research

There are still many areas where the 'amateur' can contribute significantly to the knowledge of Gower's natural history and to the conservation of the peninsula as a whole. As David Allen noted in 1978, in a remark that is still relevant today:

It is not true that the amateur has reached his (her) 'ceiling', for thankfully there still remain ample ways in which he (she) can make a useful scientific contribution, some of them ways that for a long time professionals are likely to find unappealing.

Despite Gower's importance for insects, if there is one element of the Gower fauna and flora that is under recorded it is, perhaps not surprisingly, the invertebrates. While there are almost 30,000 species of invertebrates in Britain, and they greatly outnumber the combined totals for plants and vertebrates, apart from the more obvious groups (such as butterflies, moths and some flies) they have, even recently, received

David Painter

The endangered silky wave moth, a species of open south-facing calcareous grassland.

Trysorau Gŵyr rhwng dau glawr

Mae bron cymaint o ddynodiadau cadwraeth natur ag y sydd yna o gynefinoedd ym Mro Gŵyr! Er mai ardal fechan o Gymru yw hon mae'n hynod o gyfoethog, nid yn unig o ran ei bywyd gwyllt ond hefyd o ran y dystiolaeth archeolegol sy'n ein helpu ni ddeall mwy am brosesau daearegol ac am ddylanwad dyn dros y canrifoedd.

Sut mae gwneud cyfiawnder â'r fath le rhwng cloriau llyfr? Sut mae cyfleu'r cyfoeth hwn ar bapur - y trysorau fel twyni calchaidd Whiteford, y tiroedd comin gwasgaredig gyda'u gweundir lliwgar, y clogwyni calchfaen gyda'u planhigion a'u trychfilod prin, corstir eang Oxwich ac aber Casllwchwr gyda'i heidiau anferth o adar? Mae angen talu sylw hefyd i gynefinoedd eraill y penrhyn, fel y tir âr, y coedwigoedd a'r gwrychoedd, y pyllau, y morfa heli a'r môr. Rhaid peidio ag anghofio chwaith yr hanes dynol sydd ynghlwm wrth y tirlun hwn ac sydd i'w weld yn yr ogofâu niferus ac mewn nodweddion fel hen system gaeau'r 'Viel' a gwaith halen Port Eynon.

Aeth Jonathan Mullard i'r afael â'r dasg hon, ar ôl treulio rhyw 14 mlynedd yn gweithio ym myd cadwraeth ar y Penrhyn. Cyhoeddir y llyfr ym mis Mai eleni, ar achlysur dathlu 50 mlynedd ers dynodi Penrhyn Gŵyr yn Ardal o Harddwch Naturiol Arbennig.

comparatively little attention. The populations of many British insects are currently declining rapidly, for reasons not often understood, but even in areas such as Gower their needs are not always met. Habitats in the peninsula such as shingle, soft rock cliffs, bare ground and the strand-line on the shore are extremely important for invertebrate conservation, but we still know far too little about the species that occur here. At the other end of the size scale there is still much to be learnt about the mammals present. Harvest mice, dormice, otters and polecats are all recorded but their numbers and distributions are hardly known.

There will never be a complete list of the species in Gower, despite the recent discussions by biologists about cataloguing every species of life on earth by analysing a short stretch of its genetic code, the so-called 'barcode' approach, derived from the idea of supermarket barcodes. Once you venture beyond the best-known organisms such as birds, mammals, butterflies and beetles, there are few people who can identify species with any confidence.

Including the whole of Gower's natural history in one book has been quite a challenge. The Gower *New Naturalist* may contain all the currently available information on the natural history of the peninsula, but perhaps I should leave the last word to the famous naturalist John Ray, who wrote in 1692:

I know well that the longer a book lies by me, the perfecter it becomes. Something occurs every day in reading or thinking, either to add, or to correct and alter for the better: but should I defer the edition till the work be absolutely perfect, I might wait all my life-time and leave it to be published by my executors.

The Gower *New Naturalist* will be published by Collins in May 2006, which is the 50th anniversary of the area's designation as the first AONB.

***Jonathan Mullard** is a professional ecologist who specialises in the management of protected areas. He is currently Director of Park Management for Northumberland National Park Authority but has spent a considerable part of his working life in Gower.*

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Joanne Porter

Sarn Cynfelin: an insight into its marine life

Dogfish

Three underwater reefs or 'sarnau' stretch out their long fingers of rock below the waves in Cardigan Bay, unique structures with a diversity of life to match. In the last year, surveys by volunteers have increased our understanding of this richness and the banquet it provides for dolphins, turtles, sea birds and grey seals. JOANNE PORTER provides the details.

Joanne Porter

Sarn Cynfelin above the waves

The mid-Wales sub-marine reefs are shallow subtidal features in Cardigan Bay. Interest in the wildlife associated with these reefs or 'sarnau' (Welsh for 'causeways') has been ongoing for many years as they are well known to fishermen as an obstruction to shipping. This is particularly significant for the northernmost of the three Sarnau, Sarn Badraig, where there are a number of charted shipwrecks.

The three Sarnau, Sarn Badrig in the north of Cardigan Bay, Sarn y Bwch between Fairbourne and Tywyn, and Sarn Cynfelin between Aberystwyth and Borth, extend into Cardigan Bay in a south-westerly direction from the coast. Sarn Badrig extends offshore for some 22km, Sarn y Bwch for 7km, and Sarn Cynfelin is approximately 12km long. They are all shallow subtidal features, roughly linear in shape, and composed of boulders, cobbles and pebbles with various sediment grades mixed in between.

Sarn Badrig in particular is a very impressive topographical feature, and it breaks the surface at low water at various intervals along its length up to 17km offshore. Its linear shape is clearly visible at low water from the mainland as a thin line stretching into the distance. This has given rise to ideas of artifical structures and legends of drowned villages (such

King scallop
Pecten maximus

Rohan Holt

as the legend of Cantre'r Gwaelod, after which the local Aberystwyth dive club takes its name). Sarn Badraig means St.Patrick's Causeway and it was thought to extend across to Ireland and to join up with a similar causeway on the Irish side.

The geological origins of the Sarnau begin in the Pleistocene geological epoch, when north and mid-Wales was subjected to periods of glaciation. Local glaciers originating over the various areas of high ground inland spread out from their centres of origin, scouring out valleys en route. Several of these flowed towards Cardigan Bay, down valleys that now end near Porthmadoc, Barmouth and Aberdovey. The sarnau are glacial moraines, resulting from a glacier melting and dropping its unsorted load of rock pieces of various sizes. The subsequent wave action on these moraines left the larger boulders and cobbles and the occasional large 'erratic', but washed away the small particles.

The Sarnau are apparently unique features in the British Isles and are thought to have remained intact, even though other ice flowed from the North Irish Sea, because of their location within the lee of the Llŷn Peninsula, where sufficient high land formed a natural barrier to the southward flow of the Irish Sea ice.

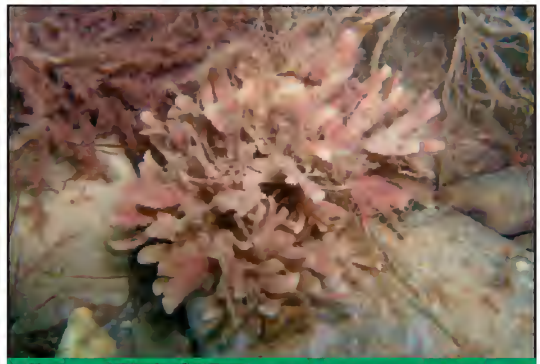
The Sarnau are exposed to wave action predominantly from the southwest and, because the reefs are so shallow, wave action has a considerable effect on the substrata present and its mobility, which in turn has an impact on the associated flora and fauna. Strong tidal streams also occur, particularly on the reef crests, and are most pronounced on spring tides. The residual current flow in the area is from the south but, due to the presence of the Llŷn Peninsula creating a large eddy in Cardigan Bay, the main residual flow over the sarnau is southwards.

Nowadays, the Sarnau are part of the Pen Llŷn ar Sarnau Special Area for Conservation (SAC). This area is so designated because of the presence of the sarnau, the sediment seabed communities, estuaries, mud and sandflats, saltmarsh, sea caves, coastal lagoons and populations of bottlenose dolphins, grey seals and otters.

The Sarn Cynfelin is the southernmost of the three sarnau and is the least studied, at least in terms of its underwater marine life. Conversely, through the activities of the charitable organisation 'Friends of Cardigan Bay' over the last ten years or so, the surface activities of bottlenose dolphins, Atlantic grey seals, leatherback turtles and a variety of seabirds have been relatively well monitored. More recently, their survey work has focussed particularly on the Sarn Cynfelin, as previous marine mammal surveys indicated that bottlenose dolphins were regularly foraging at particular 'hotspots' along the Sarn.

Over the season 2004-2005, local divers from University of Wales Aberystwyth and Cantre'r Gwaelod Divers, in conjunction with Friends of Cardigan Bay and with some funding from the Countryside Council for Wales, became involved in a survey of the 'dolphin hotspots' along the Sarn Cynfelin. Surveys conducted at the Cynfelin Patches and mid-way along the Sarn almost 20 years ago, by a Joint Nature Conservancy Council dive team and members of Shropshire Orthopaedic Hospital Sub Aqua Club, had revealed that the shallow reef crest was very rich in algal species. However, during that particular survey, only two sites were dived on the Sarn Cynfelin, with the bulk of the attention going to Sarn Badraig. The recommendations of the 1986 report state "...the very large boulders reported on Cynfelin Patches represent a habitat not covered by this survey, and both the extreme seaward and landward ends of the reefs deserve further study..."

In April 2005, a weekend of surveys was conducted, using a standard Seasearch methodology where pairs of SCUBA divers use a plastic slate to record depth, seabed type, seabed cover type, any unusual or man made impacts and a species list. This information is then transferred to official recording sheets at the end of each diving day. Further surveying was conducted over the summer when weather permitted and another weekend event took place in late August.


Joanne Porter

Hornwrack *Flustra foliacea*

The first of the April 2005 dive surveys took place at the seaward end of the Sarn Cynfelin close to the Patches cardinal marker buoy. The depth here was 17-19m, and the substrate dominated by cobbles and small boulders. The cobbles were covered in hornwrack *Flustra foliacea* and herringbone hydroid *Halecium halecinum* interspersed with large colonies of ross corals *Pentapora foliacea*. The area was active with swimming crabs *Liocarcinus depurator* and *Necora puber*, and squat lobsters *Galathea intermedia* were found sheltering in the ross corals. The king scallop *Pecten maximus* was occasionally recorded as were whelks *Buccinum undatum* with large balls of egg masses. The butterfish *Pholis gunnellus* and dogfish *Scyliorhinus canicula* were common.

A second dive area covered in the April surveys was approximately four miles west of Aberystwyth, again on the Sarn Cynfelin. Here the substrate was more varied with mixed ground; well sorted sand with ripples at 14m, pebbles and cobbles between 14-12m and patches of small boulders in the shallower areas between 6-10m. As you would expect in such a varied substrate, a diverse mixture of species was recorded. In sandy patches there were large anemones *Urticina felina* and *Urticina eques*. The cobbles were

Rohan Holt

Butterfish *Pholis gunnellus*

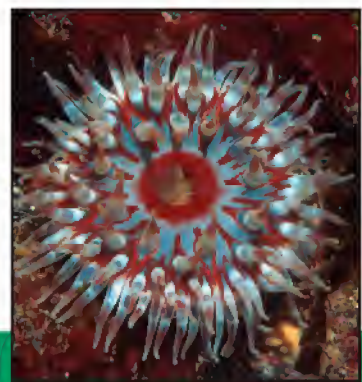
covered in hornwrack, dead man's fingers *Alcyonium digitatum* and the herring bone hydroid. Tubeworms *Pomatoceros* sp. were commonly encrusted on the cobbles. Crustacea such as edible crabs *Cancer pagurus*, swimming crabs *Necora puber* and hermit crabs *Diogenes* sp. were active, and the greater pipefish *Syngnathus acus* and sea scorpion T*aurus bubalis* were encountered. In the water column there was a bloom of small (5cm diameter) moon jellyfish *Aurelia aurita*. Tufts of red algae were observed, but these were not identified to species level.

Close to the second dive location a pod of 10-15 bottlenose dolphins was observed by the RIB coxswains and a lone grey seal was also spotted.

These surveys have given some insight into the marine life of the Sarn Cynfelin, and surveys later in the year showed the considerable degree of seasonal variation in the flora and fauna as well as considerable differences between the seaward and landward ends of the reef. At the shallower landward side, the August surveys revealed very high densities of algae, dominated by mermaids' tresses *Chorda filum* and large numbers of juvenile fish and shoals of seabass *Dicentrarchus labrax*.

Following the success of these initial surveys, we anticipate further insights during the 2006 surveying season. There have not yet been any sightings of the large glacial erratics which are thought to be present, though these would certainly be interesting habitats to survey. There is a wide range of prey items available for foraging marine mammals visiting the Sarn Cynfelin, but we have yet to discover which are the most important prey items in the bottlenose dolphin diet in this geographical area.

Dr Joanne Porter *works as a lecturer in Marine Biology at the Institute of Biological Sciences, University of Wales Aberystwyth. She has a particular interest in the biology and taxonomy of the colonial marine invertebrate phylum known as the Bryozoa. She is also a keen diver and a tutor for the Seasearch scheme.*



Rohan Holt

Anemone *Urticina felina*

Cyfrinachau Cantre'r Gwaelod

Mae yna hud a chwedloniaeth yn perthyn i'r sarnau ym Mae Ceredigion. Ond mae'r nodweddion unigryw hyn hefyd yn gynefin arbennig i fywyd gwyllt.

Rohan Holt

Whelks *Buccinum undatum* with eggs

Crëwyd y bysedd hir creigiog gan rewlifau, wrth iddynt doddi a gollwng eu llwyth o greigiau amrywiol ar eu siwrnai araf o'r tir. Dros y canrifoedd 'ysgubwyd y cerrig lleiaf i ffwrdd gan gerhyntau a thonnau, gan adael cefnau o glogfeini a choblau.

Dysgwyd llawer, yn ddiweddar, am y creaduriaid sydd i'w gweld ar wyneb y dŵr yng nghyffiniau'r sarnau. Bwriad yr arolwg a gynhaliwyd yn Ebrill 2005 oedd llenwi bylchau yn ein gwybodaeth am y bywyd tanfor, yn enwedig ar Sarn Cynfelin sy'n ardal bwysig i ddolffiniaid trwyn potel.

Darganfuwyd bod Sarn Cynfelin yn gynefin cyfoethog a'i fod yn amrywio nid yn unig o fan i fan ond hefyd o un tymor i'r llall. Gwyddwn nawr fod yma ddigon o fwyd i famaliaid morol ond rhaid gwneud gwaith pellach er mwyn darganfod, yn union, beth yw prae y dolffiniaid yn yr ardal hon.

Churchyard Conservation

Midsummer grassland with a profusion of nectar producing flowers

All photos Tony Prater

Experience being the best tutor, you are most likely to appreciate the problems facing nature conservation by getting personally involved in real places and issues. Swifts and wild daffodils got ***STELLA WOODMAN*** *involved with her local churchyard. Here she offers some general lessons about what should be done to ensure that the extraordinary wildlife value of our churchyards is recognised and cherished.*

For more than ten years now I have pondered the question – why is so little attention given to the wildlife value of churchyards in Wales? Within the context of the Welsh countryside, so much of which has been impoverished over the last 20 or more years by intensive farming, churchyards can, could, should and by accident sometimes do provide unique opportunities for nature conservation.

Many churchyards, whether in current use or not, retain a structure which includes habitats such as hedgerows, unimproved grassland, exposed rock, parkland, mature trees and old buildings, all of which are lightly managed. Despite their small size, usually one acre, these areas may be very diverse, supporting a wide range of species, some of which are becoming all too rare in the wider countryside.

Swifts and my local church

Despite my active interest in natural history and a passion for birds, I had not considered my local churchyard of importance until I discovered that a two-phased re-roofing project was likely to affect the swifts. Knowing nothing about procedures I rang the Countryside Council for Wales (CCW) who informed me that they had commented on the plans following a bat survey. They were not aware of the swift colony but brought this to the attention of the architect. Phase I did not affect the swifts.

Wild daffodils

During the intervening two breeding seasons I carried out a survey, which identified all the available roof access slots and recorded which of these were used by swifts. My survey estimated that there were 26 nesting pairs. I was assured that the new roof design would be exactly the same as the old one, but when the swifts returned only three days after the builders left, they started flying up to the nest sites but repeatedly crashed into blocks of wood obstructing their nest holes.

On seeing the problem, the newly arrived, very conservation-aware rector recalled the builder and had the blocks removed. Some of the swifts used their old nest sites, but the colony was sufficiently disturbed for a proportion of them to look for alternative sites – of which there were few. The church colony declined and in the last eight years has reached a maximum of only 12-14 pairs, some pairs settling in other less ideal buildings. At least half of those remaining have attached their nests to the battens onto which the tiles are secured, so re-opening the old access slots has not been a panacea. Coincidentally, the number of bats using the roof has also declined – the most recent survey finding just two individuals.

Wild daffodils

The same churchyard also has an important colony of wild daffodils which, despite their being a relatively rare plant, has no special protection. A change in churchyard management had resulted in grass cutting commencing in early April, and continuing on a regular basis throughout the summer and into autumn. Within four years the number of wild daffodils crashed to less than one third. With photographic evidence of this, the wildlife-friendly rector had no problem in marking out an area within a section of old graves which could be left uncut until early autumn. Whilst this represented only half of the original area supporting wild daffodils, within a couple of years they responded and in 2003 a survey found in the region of 15,000 plants in the churchyard and a tiny adjacent field.

At the rector's request I drew up a simple management plan, designed to protect the wild daffodils, as well as to enhance other small areas of wildflower-rich grassland, a habitat that no longer occurs in the farmed landscape. The plan also identified other wildlife interest, suggested easy projects to encourage wildlife and included schemes which involved the local primary school, such as a nest box project.

All went reasonably well due to the support of the incumbent, and for a couple of years after his departure, but as time went on, new incumbents,

new church wardens and a changed Parochial Church Council (PCC) led eventually to the management plan for the grassland being abandoned. The daffodil plot had been retained but year on year its size was reduced and the cutting regime became more random to accommodate the person paid to cut it. Villagers commented on the beauty and pleasure of the resurgent daffodils and, as numbers began to dwindle, on the 'poor show', but most did not appear to consider why this was happening or to ask if the decline could be stopped, let alone take any action. There is little doubt that, as with the swifts, without a management agreement the wild daffodils will be reduced to a handful and eventually will become extinct or hybridised at this site.

Some of the issues clarified by my experiences

These episodes have brought into focus some of the fundamental problems with current churchyard conservation in Wales.

Few churchyards have been surveyed for their wildlife interest, have wildlife management plans or a person on the PCC with a wildlife remit. When repairs, maintenance or changes in management are proposed, there is no information available to either church wardens or other outside organisations such as Wildlife Trusts, which would help towards informed decisions. As a result some decisions may lead to a local decline or even the local extinction of a species. Churchyard grasslands may represent the last remaining examples of unimproved land in a parish or community, a miniature map of local floral biodiversity and a precious seed bank for the future; but this value does not seem to be widely recognised.

Most species likely to occur in a churchyard will not have any statutory protection. Often their future relies on volunteers who may or may not have the necessary expertise, motivation, or time needed to work through the problems of conserving them

Wildflower haven or full of weeds? A change of thinking is needed to appreciate our churchyards.

Family of recently fledged swallows in a church porch

whilst not conflicting with the primary use of the land or building. It is more difficult to convince people there is merit in 'conserving' something they believe to be commonplace – although much that was commonplace in the countryside is now less so. In most instances the criteria for diversity are set far too low. Everyone, professional and amateur, has become used to this impoverishment. Support and encouragement from outside the area is needed if these pockets of biodiversity are to be retained.

Because there is no one single authority overseeing or managing churchyards, the lone amateur is faced with a daunting slalom-course if they wish to conserve the wildlife. To those familiar with wildlife conservation, approaching experts for advice, organisations for funding and seeking support locally may seem straightforward, but this is not how most of the volunteers on Parochial Church Councils will feel. Mostly these volunteers come from the local farming community where wildlife may be viewed as a 'problem' rather than a benefit! As a result, if faced with difficult choices they may abandon the wildlife interest as one problem too many and argue that it is not core to their church responsibilities.

The roots of the problem

The primary function of a churchyard as the final resting place for the dead and the church as a centre for worship may appear as an unhappy bedfellow with wildlife conservation. One of the problems I faced was the lack of a single source of information, advice or expertise and, amongst the various wildlife agencies and organisations, a lack of knowledge on the subject of churchyards, even to the extent of what was possible and what was not. This situation is not helped by the almost anarchic management structures of the church itself, which places responsibility for the churchyard on church wardens, who nevertheless have to operate under the direction of the Diocese and the current incumbent. All parties may have different expectations of what should be done. Few of those involved are likely to be in post for more than five years and there is almost no continuity of management. There is no mechanism for communication between outside special interests, local interest and church authorities.

Although volunteers carry out much of the work in churchyards – including small-scale conservation projects, where they exist – secure, long-term funding is crucial for wildlife conservation. The sums involved may be small, but their effect can be great. For example, special grassland management regimes may require specialist equipment or extra work time. Virtually all the fund-raising activities of a Parish will be directed to essential and often urgent building maintenance.

There is often little appreciation within a community of the 'added value' potential of the churchyard. It may represent the last remaining site of natural or semi-natural local grassland, and it may host a number of locally rare species. It offers educational and learning opportunities for all age groups within the Parish and could offer opportunities for social bonding via project work. A 'living churchyard' can also bring economic benefit via tourism.

What is needed?

The Diocese of Hereford has a scheme called 'Caring for God's Acre', which has been very successful and illustrates that it is possible to both protect and enhance the wildlife without taking anything away

from the primary function. The scheme also encompasses historical and architectural projects, which widens the interest base within the local community. The Herefordshire Project now has funding to develop a project plan for a national network of churchyard conservation advisers in England.

Wales needs its own 'Caring for God's Acre' organisation: a single, nationally funded body which acts as a link between all the stakeholders, capable of advising, disseminating information, assisting with fund raising, and helping with project management and proactive conservation work. A most important benefit would be its continuity. There are some 1200 churches in Wales, plus non-conformist chapels, which look after at least 1200 acres of potentially unimproved wildlife habitat. Almost every churchyard will have some value to nature conservation and this therefore offers a great prize for conservation throughout the whole of Wales.

A final thought

I lived in Radnorshire for 24 years and spent 10 of those struggling to achieve just a few small wildlife projects as a volunteer in my village. There were moments of despair, periods of failure and occasionally some achievements – I felt at times I was fighting a dragon single-handed. I won some of the battles but I left knowing that I had not won the war. Indeed by leaving, matters will only get worse, as there is no one to take on my role. My churchyard is probably fairly typical and I wonder how many other gems have been lost, and will be lost in the future, if their value remains largely unrecognised.

Stella Woodman *worked for the British Trust for Ornithology before moving to Radnorshire, where she continued her involvement in nature conservation largely on a voluntary basis, serving on the Council of the Radnorshire Wildlife Trust and as Chairman of their Conservation & Scientific Group. Since 1999 she has been employed by the Campaign to Protect Rural England, working in Herefordshire.*

Wild daffodils among gravestones

Lichen covered gravestone

Mynwentydd – hafan i fywyd gwyllt?

Ceir tua 1200 o eglwysi a chapeli yng Nghymru, a rhyw 1200 erw o dir o'u cwmpas. Adnodd sylweddol i fywyd gwyllt. Ond wrth geisio, yn ofer, i warchod y Cennin Pedr gwyllt, y gwenoliaid du a'r ystlumod yn ei heglwys leol, dysgodd yr awdur sawl gwers ynglŷn â chadwraeth byd natur yn y mannau pwysig hyn.

Ychydig a wyddwn, yn aml, am y bywyd gwyllt o fewn ac o gwmpas ein heglwysi. Golyga hyn fod penderfyniadau ynglŷn â rheolaeth weithiau'n cael eu gwneud mewn anwybodaeth ac anodd iawn yw canfod cyngor da ac arbenigedd ymhlith yr asiantaethau cadwraeth. Ychydig o'r bywyd gwyllt sy'n cael ei warchod yn statudol ac mae ei ddyfodol, fel rheol, yn dibynnu ar ymdrechion gwirfoddolwyr sy'n brin o egni, amser, ymroddiad ac arian i weithredu dros fyd natur. Nid yw strwythur rheolaeth cymhleth yr Eglwys, a symudiad cyson yr offeiriaid o un plwyf i'r llall yn helpu'r sefyllfa chwaith.

Mae angen un corff drwy Gymru i daclo hyn. Corff a fyddai'n cydgordio ac a fyddai'n ffynhonnell o wybodaeth, cyngor a chymorth ymarferol. Sefydlwyd y patrwm eisoes yn Lloegr, a dangoswyd bod modd gwarchod y dreftadaeth naturiol, hanesyddol a phensaernïol heb amharu ar brif bwrpas y mannau cysegredig hyn.

Marine Science communication

Scientific research is often thought to be rather mysterious with the results shrouded in secrecy. However, a new seabed-mapping project is revealing its discoveries to all. Project leaders ***ANDY MACKIE*** *and* ***CERI JAMES*** *describe what a groundbreaking survey of the outer Bristol Channel is discovering, and how the survey is being taken into the classroom and the public domain.*

Emptying the grab of RV *Noctiluca* — *Andy Mackie*

Sand is an amazing thing. It can be home to animal and plant life both in the sea and on land. It comes in a variety of grades ranging from fine muddy sands to coarse sandy gravels. It can form extensive plains or be raised up, forming anything from small ripples to large hill-like sandwaves or dunes. It can be mobile or stationary – or at least appear to be stationary, for the less cohesive forms are often easily moved by wind or tide. For people it can be both a delight and a nuisance, and it is a vital component of all our buildings, roads and bridges. Sand, quite literally, gets everywhere.

For the last two years scientists from the National Museum Wales and the British Geological Survey (BGS) have been leading a multidisciplinary investigation into the seabed between Carmarthen Bay and Devon. This part of the Bristol Channel is a potential source of marine sand for the construction industry, but relatively little up-to-date information is available on either the seabed or the life that lives there. The Outer Bristol Channel Marine Habitat Study is designed to provide the baseline information on both, so that any future use of the natural resources can be considered from a more knowledgeable standpoint. To make the most use of the data collected, the plan is to communicate the study's results and findings to the widest audience possible.

The study

The area under study reaches about 60m depth and environmental conditions are very dynamic. With a tidal range of over 7m, strong tidal currents, and exposure to Atlantic swells from the southwest,

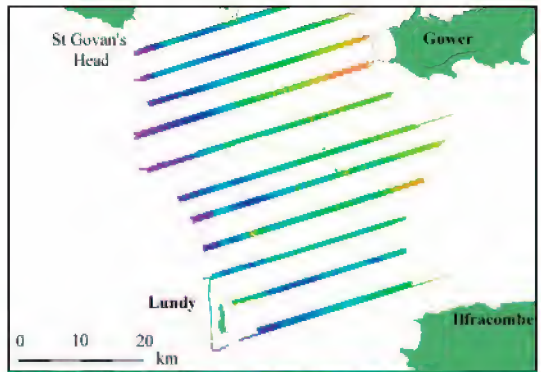
scientific surveying proved somewhat challenging. Two research vessels, the *Prince Madog* and *Noctiluca* from the Universities of Bangor and Swansea, carried out five cruises, sampling the seabed habitats and their animal communities.

Two geophysical cruises collected acoustic data on seabed shape and depth (multibeam sonar), sediment surface detail (sidescan sonar) and sub-surface structure (boomer). Surveying was aligned along 11 one kilometre wide corridors, roughly parallel to the predominant tidal stream. A further two cruises employed grabs to collect sediments, and the animals living within them, from 136 locations distributed along the geophysical corridors. Seabed photographs and video were obtained from 12 of these by Ivor Rees (University of Wales Bangor). The fifth cruise collected more photographic (11 additional locations) and boomer data, and the larger animals living on the sediment surface were assessed using a 2m beam trawl (13 locations).

Results

The geological and geophysical methods have revealed a complex mosaic of different sediment types and surface features. The study area is dominated by the extensive Outer Bristol Channel Sands (OBCSands), whose northern sector includes numerous large sandwaves, some of which can reach up to 19m high. Another interesting feature is a large tract of smaller, bifurcating high-frequency sandwaves. Large isolated sandwaves occur in the more gravelly southern sector of the OBCSands but are less common. Carmarthen Bay in the north of the study area is relatively flat with much fine sand but with rock outcrops around and west of Caldey Island. Rock outcrops also occur around Lundy and the south-east.

The area is surprisingly rich, with over 830 species present. As in the Irish Sea (Mackie et al. 1995), the highest diversity is associated with the mixed gravelly sediments. These often host a rich epifauna with hydroids, bryozoans and encrusting organisms such as sponges, barnacles and saddle oysters. These make the habitat more three-dimensional than



Study area showing multibeam sonar corridors

flat sediment areas and there are more nooks and crannies available for colonization.

There are three main animal assemblages, approximating to the shallow sands of Carmarthen Bay and its approaches, the northern sector sand wave area and the southern gravels. Within each assemblage there is evidence of subdivision, though this often appears more representative of gradients of faunal change associated with the nature of the sediments. An initial analysis of the molluscs present shows this, with the Carmarthen Bay assemblage having an inshore and 'offshore' component. Analyses of all the fauna also identify the Helwick Bank and some stony areas as representing two additional assemblages in localised areas. The former has a low species content (less than 30), the latter is much more species rich (over 100).

A number of interesting species were found. Southern species included bivalve molluscs *Diplodonta rotundata, Modiolus adriaticus* and *Rhomboidella prideux*, small amphipod *Caprella erethizon*, and polychaete worms *Goniada emerita* and the syllid *Palposyllis prosostoma*. Several of the small gastropod molluscs were notable since they are infrequently recorded. These include *Tornus subcarinatus*, *Aclis minor*, and *Odina diaphana* – all thought to be cryptic species. For example, *Noemiamea dolioliformis* and *Graphis albida* are believed to be associated with the honeycomb worm, *Sabellaria* (Killeen & Light 2001). The infrequently recorded thumbnail crab *Thia scutellata* was found on several occasions – perhaps

unsurprisingly, as it shows a preference for loose, well-sorted medium sands such as those found in sandwaves (Rees 2001).

Undoubtedly the most interesting find is the rediscovery of *'Neolepton' obliquatum*. This tiny bivalve mollusc has not been found since its discovery off Rathlin Island (Northern Ireland) in 1897. The animal was only found in a localised area of generally siltier sands toward the northwest, southeast of St. Govan's Head. Nothing is known about its ecology and it may possibly be associated with another animal. Further, its actual name is a matter of debate, since it does not conform to the accepted definition of Neolepton. A paper re-describing the mollusc and discussing its name has been prepared (Holmes et al., in MS).

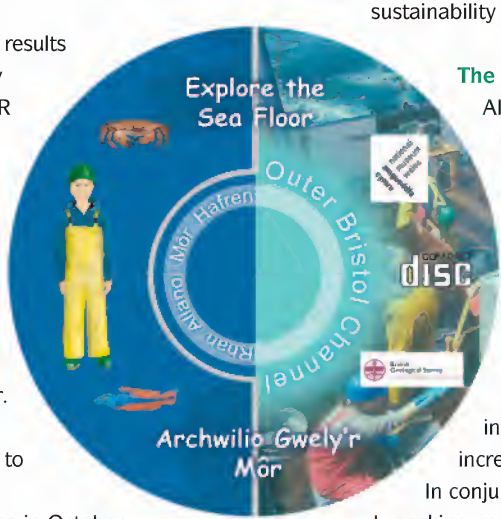
The report on the full scientific results and interpretations is currently being prepared in the BIOMÔR marine science series of the National Museum Wales. Publication of this is expected in late March.

Exhibition and outreach

The study has produced a multimedia exhibition entitled *Explore the Sea Floor*. Designed to tour different venues, the exhibition opened to the public in the new National Waterfront Museum in Swansea in October 2005. The exhibition gives an outline to the project, with information on the industry, the scientific study, and the value and use of the results now and in the future. It includes two large video displays and two interactive screens dedicated to some of the activities on the project CD-ROM. In addition, there are a variety of objects on display including attractive models of marine invertebrates and sampling equipment.

The bilingual CD-ROM has met with enthusiastic support and over 3000 copies have been distributed since November. Jane Davidson, Assembly Minister for Education and Lifelong Learning, will formally launch the *Explore the Sea Floor* CD-ROM at Penclawdd Primary School, Penclawd on February 27.

A key factor in the success of the project has been the employment of a dedicated Marine Education Officer. Some 170 workshops in 70 schools will have been carried out in 2005-2006. Many additional talks, demonstrations and events have reached individuals and groups directly, from cub scouts to University of the Third Age members, seashore explorers to sustainability conference participants.



The Future

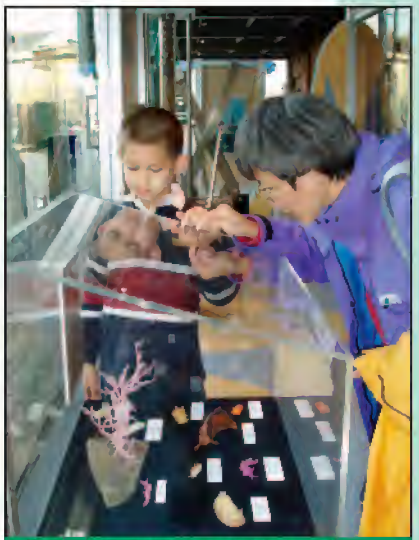
Although the current funding of the study is due to finish at the end of March 2006, the demand for outreach workshops and activities has been so large that we are now seeking additional funding to extend this aspect until at least June 2007. We plan to broaden our coverage into southwest England and increase interaction with the public. In conjunction with this, we are currently seeking new venues for the popular *Explore the Sea Floor* exhibition.

The scientific findings of the study will directly feed into other projects examining seabed mapping and predictive modelling. Two such projects are currently underway associated with EU INTERREG III programmes; the Wales-Ireland HabMap study in the

southern Irish Sea area (www.habmap.org), and the multinational NW Europe MESH project (www.searchmesh.net).

***Dr Andy Mackie**, Head of the Marine Biodiversity section in the National Museum Wales, is an expert on the polychaete worms ('bristle-worms'). The Marine Biodiversity staff members are actively involved in investigations concerning the seabed life found around Wales and in the Indian Ocean.*

***Mr Ceri James** is a marine geologist with the Marine Coastal and Hydrocarbons Programme in the British Geological Survey. He has been working on the geology and sediments of the Irish Sea and Bristol Channel, and elsewhere in the UK and SE Asia, since 1984.*



Andy Mackie

The exhibition in the National Waterfront Museum

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Support

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Further Information

Further information can be obtained through the project websites. For enquiries about this study contact: obc@nmgw.ac.uk

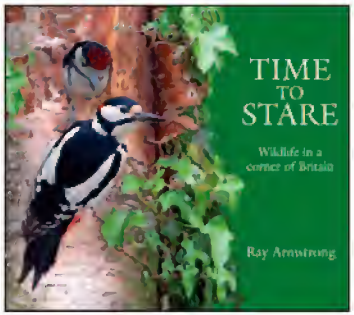
Dysgu mwy am dywod...

Mae tywod o'n cwmpas ym mhob man. Mae'n gynefin i blanhigion ac anifeiliaid ar dir a môr ac yn elfen allweddol mewn adeiladau, ffyrdd a phontydd. Mae Môr Hafren yn ffynhonnell bosib o dywod ar gyfer y diwydiant adeiladu ac aed ati'n ddiweddar i geisio dysgu mwy am y bywyd gwyllt yno, er mwyn gallu gwneud penderfyniadau call ynglŷn â chloddio.

Nid gwaith hawdd oedd cynnal arolwg yng nghanol y fath gerhyntau gwyllt ac ymchwydd cryf. Ond darganfuwyd bod yr ardal yn un gyfoethog o ran bywyd gwyllt. Cofnodwyd dros 830 o rywogaethau gwahanol yma, gan gynnwys nifer o rai diddorol ac anghyffredin. Yn eu plith roedd y gragen ddeuglawr '*Neolepton' obliquatum* nas gwelwyd ers ei darganfod oddi ar Ynys Rathlin (gogledd Iwerddon) yn 1897.

Crëwyd arddangosfa deithiol a CD-ROM ddwyieithog yn sgil y gwaith ymchwil. Bu Swyddog Addysg morol yn allweddol i lwyddiant y prosiect a chan fod cymaint o alw am weithgareddau gyda gwahanol gynulleidfaoedd mae'n fwriad i ymestyn y gwaith addysgiadol hwn am flwyddyn arall. Bydd canlyniadau'r gwaith gwyddonol yn cyfrannu at ymdrechion i fapio a rhagfynegi effeithiau ar wely'r môr.

Silff Lyfrau Amgylcheddol



TIME TO STARE – WILDLIFE IN A CORNER OF BRITAIN
Ray Armstrong
Grice Chapman Publishing, Norwich
2005 £19.95 paperback
ISBN 0-9545726-6-1
If you want to understand the big picture, take a close look at one small piece of it. The general is revealed in the particular. The focus of a limited geographical area can amplify the significance of records, observations and discoveries, and also document a life lived in fond connection with nature.

This is what Ray Armstrong has done in his local patch, twenty square kilometres of farmland and forest around Trellech in Monmouthshire. *Time to Stare* is the outcome of twenty-five years of doing just that – taking the time to observe and photograph wildlife through the seasons and over the years.

Although much of the text is concerned with general descriptions of the birds, mammals and insects which the author has seen, it is also animated by a series of first hand observations and wildlife encounters. These are informative, at times humorous, and do much to convey his passion for his local wildlife, and particularly bird life. That enthusiasm is also evident in the superb collection of photographs which fill the book, and alone provide an excellent reason to acquire a copy.

Note: *The publishers are pleased to offer readers a £2 discount, and free P&P, and will be making a donation to the Wildlife Trusts Wales with each copy sold. Please send a cheque payable to Grice Chapman for £17.95 to: Grice Chapman Publishing, The Shire House, Burgh-Next-Aylsham, Norwich, NR11 6TP, quoting Natur Cymru Reader Offer.*

A COUNTRY DIARY FOR NORTH WALES
Jan Miller
Matador, Leicester
2005
£7.95 paperback
ISBN 1 905237 35 9
North Wales is a large patch, and Jan Miller stretches her canvas wide by introducing current affairs, literature, local history, folklore and anything else that takes her fancy into her diary. The author's warm and curious personality comes to the fore, as does her enthusiasm for the delights of her home territory, primarily her corner of Denbighshire, although she does extend her commentary across the rest of north Wales.

With its chatty style, this is an easy read. For me what marks it out is the author's insatiable appetite for involving others in the pleasures of contact with, and working for wildlife. The diary is full of addresses and contact details, pointers to local activities and events, and other suggestions about what to look out for. There is plenty of material here to feed an interest in the natural world. Highly recommended.

James Robertson

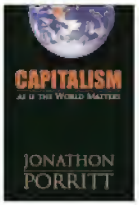
MOSSES AND LIVERWORTS
Ron Porley, Nick Hodgetts
Collins New Naturalist Series, 2005
£40 hardback
ISBN 0-00-220212-3
£25 paperback ISBN 0007174004
The *New Naturalist* series needs little introduction, as almost all British naturalists are familiar with its books' flowing, readable text and their entertaining and informative style. Number 97 covers the bryophytes – mosses, liverworts and hornworts – a new subject for the *New Naturalists*.

The first thing that strikes the reader is the cover: a beautiful lino-cut of *Frullania, Bryum, Polytrichum* and others, which has the same evocative feel as the covers of earlier members of the series. The next is the attractive layout, augmented by a collection of nearly 180 beautiful photographs, with sub-headings that allow the reader to dip in and out if a particular piece of information is desired. However, it is difficult not to read *Mosses and Liverworts* from cover to cover like a novel. The first three chapters tell of the origins and life styles of these unfamiliar little

plants. Things get technical quite quickly, but soon you get used to setae supporting spore capsules and the intricacies of leaf lamellae (there is a glossary at the back just in case). By page 26 you also hit conservation terminology, reflecting the authors' pivotal roles in bryophyte conservation in the UK, and, after that, almost every species is prefixed with its Red Data Book status (which can get a bit wearing).

Once readers have learnt about fossil bryophytes and the amazing array of dispersal mechanisms that some species employ – the sticky spores and gemmae of *Schistostega pennata* probably help it hitch a lift between sand martin burrows – they can begin a hugely informative tour of the British Isles, examining the mosses and liverworts of each major habitat. The writing shows the enthusiasm of the authors extremely well and you quickly realise that they have seen all the species they discuss in all the places they mention. The most astonishing thing is how up to date they are: discoveries made in May and June 2005 are discussed in detail. If there is one thing that might jar a little with *Natur Cymru* readers, it is the slight English and Scottish bias to the tour, but this is a very minor fault in a generally excellent book. If you already know about mosses and liverworts, you are bound to enjoy this book; if you don't then you are in for a wonderful eye-opener.

***Sam Bosanquet**, British Bryological Society recorder for Monmouthshire & Pembrokeshire.*



CAPITALISM AS IF THE WORLD MATTERS
Jonathon Porritt
Earthscan 2005
£18.99 Hardback
ISBN 1844071928

In 1985 a friend gave me a book that would change my life. It was Jonathon Porritt's *Seeing Green - the politics of ecology explained*. Some 20 years on, with *Capitalism as if the World Matters*, has Porritt sold out?

His thesis is easily described: our continued unsustainable use of the world's resources is such that we cannot wait for a Green revolution to save the planet. Capitalism is now the only economic game in town, and it is only through reform of that system that we can address these problems in time.

In a provocative chapter, the environment movement is lambasted for failing to make a positive case for an alternative to capitalism's present incarnation, despite that system trashing the environment and making us ill and unhappy into the bargain. Porritt maintains that issues cannot be pigeon-holed; it is only through regarding social justice, third world poverty, and the environment as all part of one greater issue that we can ever see meaningful change. Yet many take such a narrow, regulatory, depoliticised and preservationist view of the environment, that '…any mention of the bigger picture…sends them running off back to their bird boxes'.

Porritt reserves his harshest comment for those he regards as in 'denial', but he concentrates on the US Christian fundamentalist right, who regard sustainable development as un-American. After all, why bother about the future if you see natural and man-made disasters as foretold in the Book of Revelation, and signs of the return of Christ? Personally, I found this criticism of the US too focussed on the Republican Party. George W. Bush does not represent the whole of America, as California and the New England states (both working on their own response to Kyoto and climate change) have shown. In 2008, a USA under President Hillary Clinton might look quite different. Closer to home, the British 'progressive left' does not escape Porritt's brickbats, given their total failure to get to grips with the climate change issue, when so much more was expected from them.

The case for change is persuasively put, even if some issues, such as the regressive effect of an energy tax on the poorest in society, seem too easily swept aside. Has Jonathon Porritt CBE gone soft on the system? No, I don't think so. If *Seeing Green* was the idealistic product of youth, then *Capitalism* reflects a more thoughtful middle age. He sets out a course for a 'sustainable capitalism' radical enough to tackle the problem without scaring the middle classes too much. If you're ready to consider why your local nature reserve, Chinese economic growth and poverty in Malawi are connected, this is essential reading. If not, your bird boxes beckon.

Andrew Lucas

Cymru a'r byd

Pa wleidydd fyddai'n ddigon dewr i argymell treth tanwydd ar hedfan, er mwyn adlewyrchu'r costau amgylcheddol enfawr a ddaw yn sgîl hedfan yn rhad ac er mwyn rhoi diwedd ar hedfan yn ddiangen? Nid yw'r dreth angenrheidiol ac anochel yma ar yr agenda. Eisoes, mae amgylcheddwyr yn ymwybodol na fydd eu pryderon yn cael unrhyw sylw mewn trafodaeth wleidyddol sy'n canolbwyntio cymaint ar yr economi. Does wiw i unrhyw beth darfu ar ddarparwr mawr gwasanaethau cyhoeddus a swyddi'r wlad, ni waeth be fo'r gost wirioneddol. Trech economi nac amgylchedd.

Ond ymddengys nad yr amgylchedd-dwyr yn unig sy'n gweld ymhellach na'r gwleidyddion. Fis Chwefror, fe ddarganfu pôl piniwn y Guardian/ICM fod 63% o'r cyhoedd o blaid treth 'werdd' a fyddai'n perswadio pobl i beidio ag ymddwyn mewn ffordd a fyddai'n niweidio'r amgylchedd. Nid dyma'r pôl piniwn cyntaf i awgrymu bod barn y cyhoedd ar y blaen i farn y Llywodraeth wrth ymdrin â materion gwyrdd. Felly, ai barn gwleidyddion yw fod y cyhoedd yn arddel syniadau 'gwyrdd' mewn polau piniwn, ond eu bod yn eu taflu i'r naill ochr wrth nesu at y blwch pleidleisio? Ynteu a yw gwleidyddion yn gwbl analluog pan fo angen ffrwyno system economaidd sydd wedi mynd y tu hwnt i reolaeth, sef system lle ceir twf diddiwedd a lle caiff cyfyngiadau naturiol eu hanwybyddu?

Mae'r Cynulliad Cenedlaethol wedi bod yn fwy na pharod i drafod â chyrff sy'n ymboeni am yr amgylchedd. Mae rhywbeth o'r enw 'Cynllun y Sector Gwirfoddol' wedi ei ddatblygu er mwyn galluogi cyrff llywodraethol a chyrff anllywodraethol i ddod ynghyd i gael trafodaeth agored a phlaen. Hefyd, ceir rhywbeth o'r enw 'Compact yr Amgylchedd', sy'n dod â chyrff anllywodraethol ac asiantaethau amgylcheddol statudol ynghyd. Felly, ceir perthynas eithaf da rhwng y llywodraeth ac asiantaethau statudol ar y naill law, a chyrff anllywodraethol ar y llaw arall.

Golyga hyn fod gan gyrff anllywodraethol gyfle gwirioneddol i ddylanwadu ar Strategaeth Amgylcheddol y Cynulliad, fel sefydliadau unigol a thrwy gyfrwng Cyswllt Amgylchedd Cymru, sy'n cynrychioli 25 o gyrff anllywodraethol. Wrth gwrs, nid yw holl ddyheadau'r cyrff cadwraethol wedi eu bodloni yn y Strategaeth ddrafft, oherwydd yn anochel mae dogfennau o'r fath yn gofyn am gyfaddawdu a chydbwyso, tra mae cyrff amgylcheddol yn ceisio newid y blaenoriaethau presennol gan roi llais cryfach i'r amgylchedd.

Er hynny, pe bai'r Strategaeth yn cyflawni'r hyn sydd ganddi dan sylw, fe fyddai'n gam enfawr ymlaen. Y canlyniadau a gaiff eu crybwyll yw cael moroedd glân sydd â'r gallu i gynnal ecosystemau iach sy'n amrywiol yn fiolegol, yn gynhyrchiol ac sy'n cael eu rheoli'n gynaliadwy. Bydd cynllun gweithredu yn pennu sut y gellir cyflawni hyn oll, ac fe geir cerrig milltir yn ogystal â dangosyddion y gellir eu defnyddio i fesur cynnydd.

Y pryder yw y bydd cyrff amgylcheddol yn buddsoddi eu holl ymdrechion yn y dogfennau polisi doeth hyn, ond mai'r unig beth a ddigwydd yw y byddant yn hel llwch. Mae hyn wedi digwydd sawl tro; ond rhaid sicrhau na fydd yn digwydd y tro hwn. Gwaith anodd iawn yn penderfynu a yw dogfennau o'r fath yn gwneud gwahaniaeth sylweddol mewn gwirionedd, ac mae llawer yn dibynnu ar y ffaith a ydynt yn dymuno i gyrff ac adrannau'r llywodraeth fynd ati mewn ffordd wahanol i wneud pethau, er budd yr amgylchedd. Mae moroedd y wlad ymhell o fod yn lân, ac mae ecosystemau'r môr ymhell o fod yn iach – a yw strategaeth ar damaid o bapur yn mynd i newid hyn?

Yn eu doethineb, mae cyrff amgylcheddol wedi croesawu'r Strategaeth Amgylcheddol, yn y gobaith y bydd yn gwneud gwahaniaeth gwirioneddol pan gaiff ei chyhoeddi'n ddiweddarach eleni. Dylai pob un ohonom gadw llygad barcud ar y Mesur Morol sydd ar ddod, a'r elfennau sy'n berthnasol i Gymru, i weld a fydd yn cynnig fframwaith deddfwriaethol cryf i amgylchedd y môr, gan gynorthwyo i wireddu un o ganlyniadau Strategaeth Amgylcheddol y Cynulliad. Dyma ffordd dda o brofi penderfynoldeb y llywodraeth. Beth bynnag fo'r canlyniad, fe fydd cyrff anllywodraethol eisiau parhau i drafod â Llywodraeth Cymru. O leiaf ni fydd yn rhaid i drigolion Cymru ddisgwyl yn rhy hir cyn cael cyfle i ddweud eu dweud ynghylch perfformiad amgylcheddol Llywodraeth y Cynulliad.

Tony Prater

Wales and the world

Tony Prater

What politician would dare advocate an aviation fuel tax, to reflect the huge environmental cost of cheap air travel and to curb unnecessary flights? This necessary and inevitable tax is not on the agenda. Environmentalists are already aware that their concerns hardly register in a political discourse dominated by the economy. Nothing must interfere with the great provider of public services and employment, regardless of the true cost. To turn a catch phrase around, 'it's the stupid economy'.

But it seems that it is not just environmentalists who are ahead of the politicians. A Guardian/ICM poll in February found that 63% of the public approved of new green taxes to discourage environmentally damaging behaviour. This is not the first poll to suggest that the public is ahead of the Government on green issues. So is the political calculation that the public adopts green clothing for opinion polls, but discards them at the ballot box? Or are politicians actually impotent when it comes to curbing a runaway economic system, based on a model of endless growth that ignores basic natural limits?

The Welsh Assembly has been more than ready to enter into a dialogue with organisations concerned about the environment. Something called the Voluntary Sector Scheme has been developed to allow government and the non-government organisations (NGOs) to come together for an open and genuine debate. There is also something called the Environment Compact, which brings together NGOs and the statutory environment agencies. So there are generally good relations between government and statutory agencies, on the one hand, and NGOs on the other.

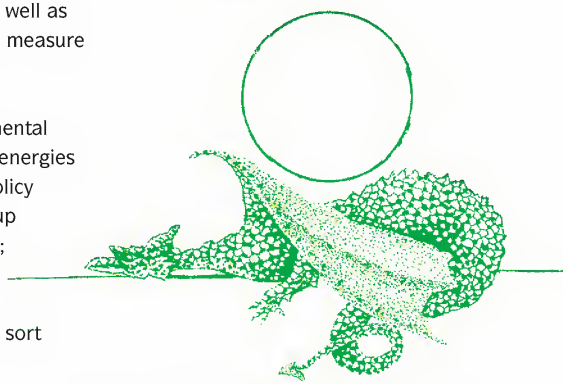
What this means is that NGOs have had a real opportunity to influence the Assembly's Environment Strategy, both as individual organisations and through Wales Environment Link, which represents 25 member NGOs. Naturally all the aspirations of conservation organisations have not been met in the draft Strategy, for such documents inevitably involve compromise and balance, while environmental organisations are seeking to change the existing order of interests and give the environment a stronger voice.

Nevertheless if the Strategy actually achieves what it sets out to do, it will be a big step forward. The outcomes being talked about are things like 'our seas are clean and support healthy ecosystems that are biologically diverse and productive and managed sustainably.' An action plan will set out how all the outcomes are to be achieved, and there will be milestones as well as indicators against which to measure progress.

The worry is that environmental organisations put all their energies into these fine-sounding policy documents, and they end up collecting dust. Many have; this one must not. It is never easy to work out whether documents of this sort really make a significant difference, and much depends on whether they require organisations and parts of government to do things differently, to the benefit of the environment. The seas are far from clean, marine ecosystems are far from healthy – is a strategy document going to change this?

Environmental organisations have rightly given the Environment Strategy a fair wind, in the hope that it will make a real difference when it is published later this year. We should all watch carefully to see if the forthcoming Marine Bill and its Welsh component will provide a strong legislative framework for the marine environment, and will help deliver one of the Assembly's Environment Strategy outcomes. This will be a good test of government resolve. Whatever the outcome, NGOs will want to keep the dialogue going with the Government in Wales. At least the public in Wales does not have too long to wait for an opportunity to say what they think of the environmental performance of the Assembly government.

Tony Prater



Ivor Rees

***Ivor Rees* reports on scarcity and what marine species to cherish.**

During a recent research vessel sampling trip, three species turned up in the incidental by-catch that were each so scarce as not to have been on the database of Welsh seabed fauna held by CCW. They were not even microscopic, difficult to identify or recent immigrants. This prompts thoughts on scarcity as one of the main criteria for picking species needing Biodiversity Action Plans or for placing on any of the plethora of schedules so beloved in the world of conservation bureaucracy.

Only a month or two earlier there had been a call for a list of marine species for which Wales might hold significant proportions of the entire world population. While Manx shearwater and grey seal fit this criterion, given the continuity of the seas, it is not obvious what marine invertebrates to suggest. Many of the truly marine species or groups on current Welsh BAP lists seem to have got there as much for charisma as for scarcity or vulnerability. With changes to marine conservation regimes in prospect in the Marine Bill, it may be time to balance popular choice with more objective criteria. It seems to me that marine conservation still partly follows the dictum in George Orwell's Animal Farm that all animals are equal but some are more equal than others.

Of the three species that prompted the above introspection, the first was an Echiuroid worm Maxmuelleria lankesteri. This large green sausage-like animal clearly lacks the pulling power of seals and dolphins. That it had not previously been noted in Wales was partly due to the comparative scarcity of suitable mud habitat and partly due to the sampling methods that have been used. In UK terms it is not really a scarce species, being widespread in Scottish sea lochs. Maxmuelleria does have a notable claim to fame in that it caused re-appraisal of nuclear discharges from Sellafield. Early assumptions based on mathematical models about the burial of particles were shown to be badly wrong because of the way the worms re-work the muddy sediment off Cumbria. To some environmentalists, perhaps this gives it a few extra charisma points.

The second unusual find was of living specimens of the large bivalve Callista chione. Strictly speaking this was not a totally new addition to Welsh fauna lists as there had been a few 19th century records. Moreover, shells of unknown antiquity are to be found on some beaches. Callista is one of several southern marine species that just reach their northern limits around southwest Wales. As such it well illustrates the dilemma of conservation targets for tiny populations at species range extremities when in core areas they can be seen in fish markets. Even if they warrant fewer charisma points from the diving fraternity than the sea fan Eunicella or the fan mussel Atrina fragilis, Callista would be attractive to shell collectors.

The third species, the snapping shrimp Alpheus glaber, scores a few points amongst biologists because of the dramatic action of the modified chela. For the present discussion it also illustrates a problem of what at sea should qualify as a Welsh record. Those seen this September came from deep water well out in the Celtic Sea beyond the Smalls. On account of this rock, Wales extends further offshore here than anywhere else. There were several previous records of snapping shrimp in the Celtic Sea beyond the twelve-mile limit, so a wider view has to be taken. Scarcity cannot just be a matter of what makes it across an arbitrary line.

***Ivor Rees** is a marine biologist and formerly was senior lecturer in Ocean Sciences at the University of Wales, Bangor.*

Ivor Rees

Snapping shrimp

Sturgeon

The European sturgeon *Acipenser sturio* was once widespread all over Europe. Its range extended from the White and Baltic Seas, via the North Sea and the eastern North Atlantic, to the Mediterranean and the Black Sea. The species ascended all major rivers in these regions for spawning purposes, including the Elbe, Rhine and Gironde, although the complete former range of the European sturgeon may never be known.

There are also several records that sturgeon have penetrated the Bristol Channel and ascended the Severn, either to feed or to spawn. The last sighting in the Severn was in the late 1980s and the most recent sightings in English or Welsh waters were in the Tywi, south Wales, in 1993. Today, only isolated specimens are caught in west European waters, none migrate up the Rhine and the Elbe any more and only comparatively few are left in the Black Sea and its tributaries.

In recent years there have been several cases of sturgeon by-catch, involving UK and German fishermen. The most recent occurred on 2 June 2004 in the Bristol Channel south of Swansea, when a sturgeon was caught at a depth of between 10 and 20 metres. It weighed 120 kg, and was 261cm (8' 6") long including the tail fin. The sturgeon, being a 'Royal Fish', was subsequently offered to the Sovereign in accordance with a tradition going back to the reign of Edward II.

A study of mitochondrial DNA of the specimen has since established that it belonged to the closely related Atlantic sturgeon. This fish inhabits rivers, estuaries and ocean waters along the east coast of North America, the Gulf of Mexico and the northern coast of South America. Long distance migrations of up to 3,000 km have been reported, but the specimen caught in the Bristol Channel must have been in excess of 5,000 km from its native waters.

The story may be more complex than that of a transatlantic journey. The European sturgeon from the Baltic Sea is genetically closer to the Atlantic sturgeon than it is to the European sturgeon from the Gironde. Maybe in the past some specimens did travel back from America to Europe and mixed with European stock, or perhaps there are still some European sturgeon roaming within UK waters which are genetically very close to the Atlantic sturgeon.

Did sturgeons spawn in Britain? One line of evidence comes from shells of the giant freshwater pearl mussel *Margaritifera auriculata*, which have been found in the Thames dating to some 4,000 years BP. Freshwater pearl mussels have parasitic larvae, which attack the gills of specific host fish. For a population of mussels to be sustained, the host must be reasonably common. In Spain, where some of the last remaining populations of this rare mussel occur, the principal host species is European sturgeon. This suggests that sturgeon were not only present in the Thames, but were sufficiently common to sustain a population of mussels.

Today, sturgeons are strictly protected, but there is a lack of awareness of their status. In the Elbe several years ago a female sturgeon was caught by an angler, and subsequently presented to Helmut Kohl at a banquet in his honour. This was a female fish ascending the river to spawn – it had already been caught and released by a more environmentally aware angler. Neither this nor the Welsh sturgeon should have been landed. Raising awareness and – most importantly – educating fishermen and fisheries advisors on 'untouchables' is of paramount importance in order to reduce the number of illegal landings.

We believe that we also have a moral obligation to endeavour to restore the European sturgeon to its former range. Given the present parlous state of most populations, this might involve an extensive captive breeding and restocking programme. However, such a programme would require further research to establish its former distribution, and to ensure that conditions in the wild were conducive to re-establishment of lost populations. In many areas, habitat restoration work may be necessary. In the meantime, we must continue to raise awareness to ensure that as few as possible of these magnificent fish are killed.

Dr Ziggy Otto, Dr Tristan Hatton-Ellis and Dr David A. Johnston

Hysbysfwrdd / Noticeboard

If you would like your wildlife event to feature on this page please contact Mandy Marsh on 01248 385574 or email m.marsh@ccw.gov.uk

Wales Biodiversity Partnership

WALES GOES WILD

10-18 June *Wales Biodiversity Week.* Ewch allan i fwynhau amrywiaeth bywyd! Get out there and experience the variety of life! Check out what's happening in your area.
www.biodiversitywales.org.uk
www.bioamrywiaethcymru.org.uk
Tel: Emily Fleur Dicks, **01248 385 599**

Centre for Alternative Technology

SUMMER EVENTS

8-23 Apr; 28 May-4 Jun; 22 Jul-1 Sept. *Children's Theatre Activities.* Varied programme of holiday activities where kids can learn how to reduce their impact on the earth. 11-4pm Strawbale Theatre.
30 Apr *Tree Tour.* Guided tour of the native trees found at the eco-centre.
13 & 14 May; 12 & 13 Aug. *Organic Gardening Tours,* incl. Gardeners' Question Time 2pm daily.
27 & 28 May *Annual Food Fair.*
17 Jun *Bicycle Event* for National Bike Week.
18 Jun *Sun-Day.* Celebrate the longest Sunday of the year with a solar guided tour and solar product display.
16-25 Jun *to be confirmed. Architecture Tour.* Take a tour of CAT's buildings with our buildings expert.
8 Jul *Sustainable Science Symposium.* Presentations, discussion and activities.
How to get there: CAT is 3 miles north of Machynlleth on the A487. Contact **01654 705 957** or **info@cat.org.uk** or visit **www.cat.org.uk** for full details.

Fenn's, Whixhall & Bettisfield Mosses

SPRING/SUMMER EVENTS

All events MUST be booked in advance and are free unless stated. Contact Joan Daniels on **01948 880362** (weekdays), **07974 784799** (weekends) or **joan.daniels@english-nature.org.uk**, or visit **www.english-nature.org.uk**
23 Apr *Creative Writing Picnic* with Gladys Mary Coles. Manor House, 12.30-4.30, £1.50.
6 May *Birds of the Mosses Walk* with Estelle Hughes and Eric Marsh. Manor House, 1.30 for 2pm start.
21 May *An Introduction to the Mosses Walk* with Peter Boardman. Morris's Bridge, 2pm.
3 Jun *Moths of the Mosses* with Peter Boardman. Bettisfield Moss, 8-til late.
25 June *Tales on the trail of creepers and crawlers;* all kinds of mini-beasts at Whixall Moss' with Helen East. A storytelling afternoon for kids of all ages. Morris's Bridge, 2pm.
30 Jul *Dragonflies on Whixall Moss* with Peter Boardman. Morris's Bridge, 1-4pm.

Denmark Farm Conservation Centre

COURSES & EVENTS

10 May *Storymaking in the Environment* - Environmental Education workshop with Jonathan Cree.
22 Jun *Interpreting and Recording Change in Grasslands*, an Introduction with Richard Williams
26 Jun *Phase 1 Habitat Survey*. Karl Crowther.
27-29 Jun *Introduction to the Identification of Grasses, Sedges and Rushes.*
For more details of these and other events and courses, contact **01570 493358** or **set@denmark-farm.freeserve.co.uk** or see **www.shared-earth-trust.org.uk**

The Mammal Society

TRAINING COURSES

For full details of these and other courses phone **020 7350 2200**.
7-9 Apr *Mammal Identification* FSC Rhyd y Creuau, Conwy.
2-4 Jun *Mammal Ecology & Conservation* FSC Preston Montford, Shropshire.
10 Jun Avon WT, Bristol; **7 Jul** FSC Preston Montford, Shropshire; **15 Jul** S& W Wales WT, Tondu *Small Mammal Ecology & Survey Techniques*.
4-6 Aug *Mammal Ecology & Conservation* FSC Dale Fort, Pembs.

Youth Hostel Association

SPRING WALKING

3-7 Apr. Brecon Beacons walks led by National Park wardens, and 4 nights full board. Explore the Brecon Beacons with an expert guide. YHA Danywenallt, **01874 676677**. **Danywenallt@yha.org.uk**

Snowdonia Society

EVENTS

For full details contact **Tŷ Hyll/The Ugly House, Capel Curig, Conwy, LL24 0DS**. Tel: **01690 720287**, email: **info@snowdonia-society.org.uk**
6 May *Plant Sale* - Popular fundraising event. All donations of plants, roots and refreshments gratefully received.
10 May *Tŷ Hyll Garden Open Day*
19 May *Gwaith Powdr Reserve* - Guided visit to the former explosives site. Meet 2.30pm at GR615388.
10-11 Jun *Recreation and Access Conference* - Plas Y Brenin, Capel Curig.
17 Jun *Traverse of the Carneddau Range* - Strenuous walk with Brian Shelley from Aber to Ogwen. Experienced walkers only. Ogwen Car Park (GR649603) 10 am, £5. Minimum number required - register your interest by the 12th May.
18 Jun *Painters' Challenge.* A chance for amateur painters to receive expert advice. St Julittas, Capel Curig.

South & West Wales Wildlife Trust

Here are just a few of the EVENTS on offer in coming months. For full details contact the Trust on 01656 724100 or info@welshwildlife.org
15 Apr *Snake search on Caerphilly mountain* with Rhys Jones. Cefn Onn car park 2pm (ST 178836).
29 Apr *Visit to Skomer Island.* Martin's Haven 9.30am (SM761091). Price £14.
30 Apr *Dawn Chorus at Gelli Hir*
7 May *Dawn Chorus Meeting* with Neil Matthew. Llandeilo Bridge 4.30am.
14 May *Carmel Woods* with Matt Ridley. A476 lay-by 300yds N of Stag & Pheasant, Carmel (SN590158). *Reserve* with Rob Taylor. Please book 01792 232808 or **jo.mullet@swansea.gov.uk**

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